DEVOTED TO
TEXTILE
WET-PROCESSING
•
CHEMISTRY
BLEACHING • DYEING
PRINTING • FINISHING

NOVEMBER 15, 1948
VOLUME 37, NO. 23

AMERICAN DYESTUFF REPORTER

OFFICIAL PUBLICATION
of the
PROCEEDINGS
AMERICAN ASSOCIATION
OF TEXTILE CHEMISTS
AND COLORISTS

A New Candidate

for election to your dyehouse—and one that will meet unanimous approval of all parties . . .

SOLOPHENYL BLUE 6 G L

Campaigning on a platform offering

1. A clear bright greenish shade of blue for Cotton or Viscose Rayon.
2. The best in Direct color light fastness.
3. Good Resistance to popular anticrease finishes.
4. Dischargeability and Acetate reserve.
5. All around good working properties.

This candidate, *Solophenyl* Blue 6 G L*, can always be tried before election by product sample or trial lot.

**Registered U. S. Patent Office.*

GEIGY COMPANY, INC.

89-91 BARCLAY STREET NEW YORK—NEW YORK

Boston · Philadelphia
Charlotte, N. C. · Portland, Ore.
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Geigy
Dyestuff Makers Since 1859

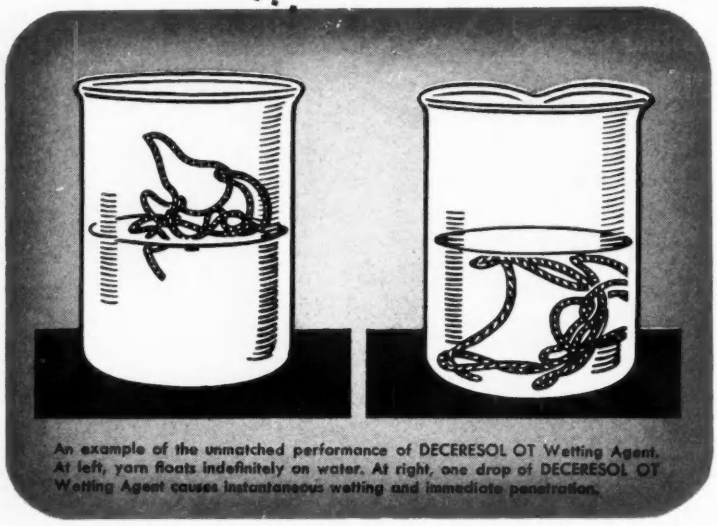
In Great Britain
The Geigy Co., Ltd.
National Buildings
Parsonage, Manchester

FOR IMMEDIATE SINKING IN WATER...

IN IMMEDIATE SUPPLY...

AND IMMEDIATE DROPPING IN COSTS...

STANDARDIZE AT THE QUALITY LEVEL WITH



An example of the unmatched performance of DECERESOL OT Wetting Agent. At left, yarn floats indefinitely on water. At right, one drop of DECERESOL OT Wetting Agent causes instantaneous wetting and immediate penetration.

...DECERESOL OT Wetting Agents

You get speedier application in the wetting of textiles – better penetration, dispersing and dye levelling properties – when you standardize on Cyanamid's DECERESOL° OT Wetting Agents, now again available in larger quantities.

But that is only *one* side of the story. DECERESOL OT Wetting Agents are also very economical to use. A little of it goes a long way. Its efficiency lowers costs, saves time.

And don't forget this *third* important advantage: the continual use of DECERESOL OT Wetting Agents results in *higher quality production*, as well.

If you are not now using DECERESOL OT Wetting Agents, it will pay you to write for further information about these superior wetting agents. Or, if you wish, one of our representatives will be glad to call and demonstrate DECERESOL OT Wetting Agents to you personally.

AMONG CYANAMID PRODUCTS FOR THE TEXTILE INDUSTRY ARE . . . AQUASOL° Sulfonated Castor Oils; NO-ODOROL° Finishing Oils; DECERESOL° OT Wetting Agents; PARAMUL°° 115 Water Repellent; Penetrants, Softeners, Finishes, Sizing Compounds, and other specialties and Heavy Chemicals. For low-cost chemical equivalent of distilled H_2O . . . FILT-R-STIL° Demineralizing Units.

SALES OFFICES: Boston, Mass.; Philadelphia, Pa.; Pittsburgh, Pa.; Baltimore, Md.; Charlotte, N. C.; Cleveland, Ohio; Cincinnati, Ohio; Chicago, Ill.; Detroit, Mich.; Kalamazoo, Mich.; St. Louis, Mo.; Los Angeles, Calif.; San Francisco, Calif.; Seattle, Wash. In Canada: Dillons Chemical Co., Ltd., Montreal and Toronto.

°Reg. U. S. Pat. Off. °°Trademark

American Cyanamid Company

Industrial Chemicals Division

30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

American Dyestuff Reporter, Vol. 37, No. 23. November 15, 1948. Published every other Monday. Copyright 1948, by Howes Publishing Co., Inc., One Madison Ave., New York 10, N. Y. Domestic subscription, $5.00; Canadian, $6.00. Foreign, $10.00. Entered as second-class matter, Nov. 6, 1919, at the New York, N. Y., Post Office, under the act of March 3, 1879.

BOTH WASH AND LIGHT FASTNESS ARE COMBINED IN —

COPRANTINE *Colors*

The Coprantine Colors are a new class of substantive dyestuffs. They give, by the usual direct color procedure, dyeings on vegetable fibres, which when aftertreated, combine with copper salts to form exceedingly stable, complex compounds of excellent fastness to both light and washing.

APPLICABLE TO:

- **VISCOSE RAYON**
- **COTTON**
- **WOOL BLENDS**
- **ACETATE BLENDS**

IN YARNS, HOSIERY, KNIT GOODS AND WOVEN FABRICS.

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NEW YORK

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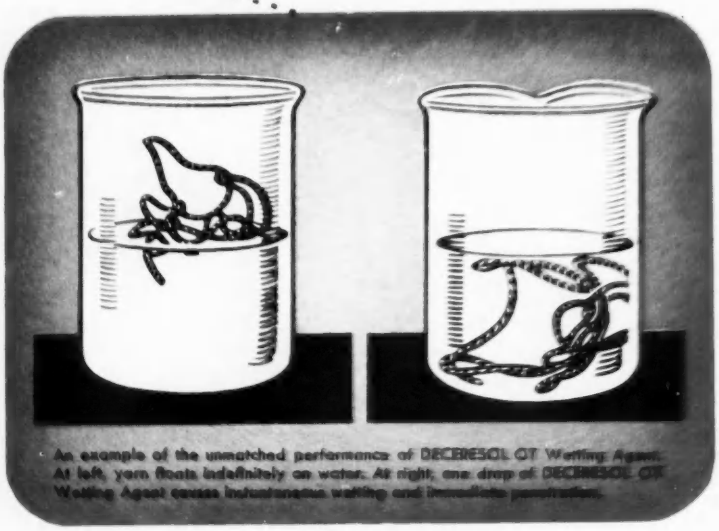
VAT DYES OF THE DOW CHEMICAL CO.

FOR IMMEDIATE SINKING IN WATER . . .

IN IMMEDIATE SUPPLY . . .

AND IMMEDIATE DROPPING IN COSTS . . .

STANDARDIZE AT THE QUALITY LEVEL WITH



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NEW YORK

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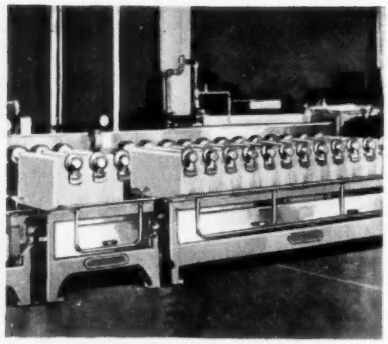
VAT DYES OF THE DOW CHEMICAL CO.

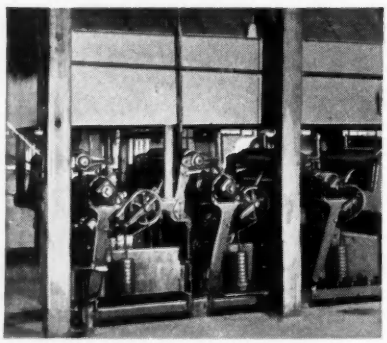
HOW THESE OPERATIONS CAN GIVE YOU THESE RESULTS



COTTON BOIL-OFF

Clean, Absorbent Cottons!

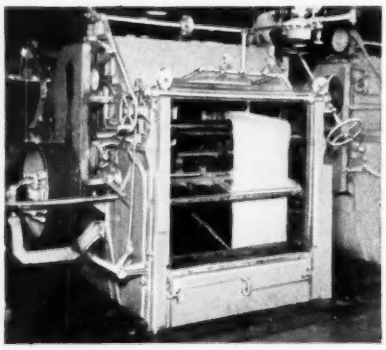
It is usually unnecessary to kier boil cotton yarn. Often a less severe open boil-off may be used. In the latter case, ARMOUR'S ENERGETIC has proved most successful. ENERGETIC is a liquid, nonionic type of synthetic detergent with excellent washing properties. ENERGETIC is unaffected by hard water, easily rinsed and effective in very low concentrations. And ENERGETIC provides remarkable suspending power for removing natural cotton impurities.



SOAPING OFF PRINTS

Clear, Bright Prints!

After printing and aging, cotton prints must be washed to remove the stiffening effect of the starches and gums used in the printing operation. This job normally calls for high temperatures and maximum detergent action. FLINT, a tallow soap especially formulated for high temperature work, is most effective in this operation. It removes the relatively large amount of gums present and also gives the goods a uniform feel or handle. FLINT thus assures clearer, cleaner, brighter, sharper prints—and more attractive fabrics!



FULLING AND SCOURING

Soft, Resilient Worsteds!

In fulling worsteds, you need a light fulling and scouring action. That's one of the reasons why Armour's CERTIFIED is the best soap for this job. CERTIFIED provides body for the fulling operation and also for suspending and carrying away the oils applied in the spinning process. CERTIFIED's easy solubility and good rinsability guarantee clean, resilient goods.

Remember, There are Armour Soaps and Synthetic Detergents to Solve All Your Textile Problems.

ARMOUR and Company

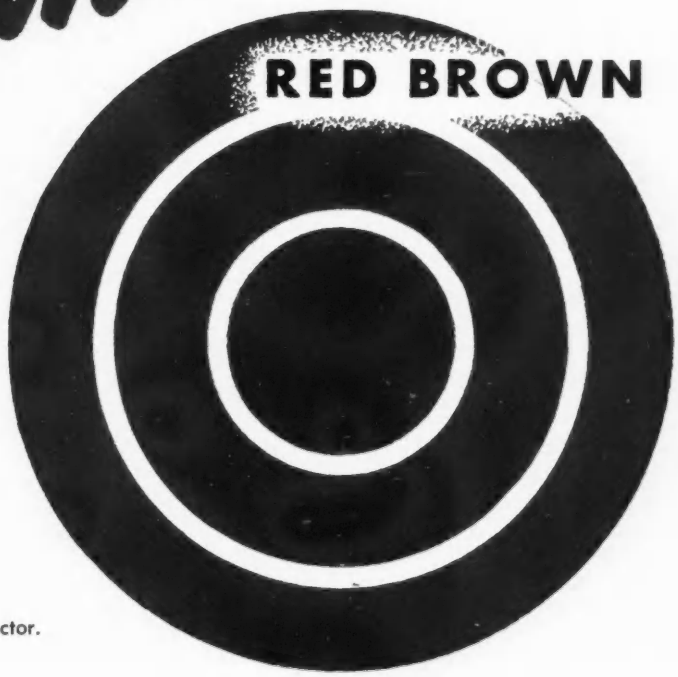
Industrial Soap Division

1355 WEST 31ST STREET • CHICAGO 9, ILLINOIS

AMANTHRENE* VAT COLORS
provide the answer to the demand for better color fastness in textiles

Amanthrene

RED BROWN



in double paste or
double powder form

An excellent base color for deep chocolate browns and a shading element for taupes and tans where fastness to light, washing, chlorine and perspiration is a factor.

Satisfactorily meets the requirements for slip cover materials, upholstery fabrics, sports wear, and men's work clothes.

Suitable for cotton and rayon yarn in warp, beam and package dyeing equipment, as well as for skein work and hosiery. Well adapted, also, to jig and pad-jig dyeing of piece goods.

Another of the Amanthrene range of superior vat colors. For detailed information on the whole range available, as well as data regarding your own particular requirements, consult our nearest branch. A.A.P. technicians are always happy to be of service.

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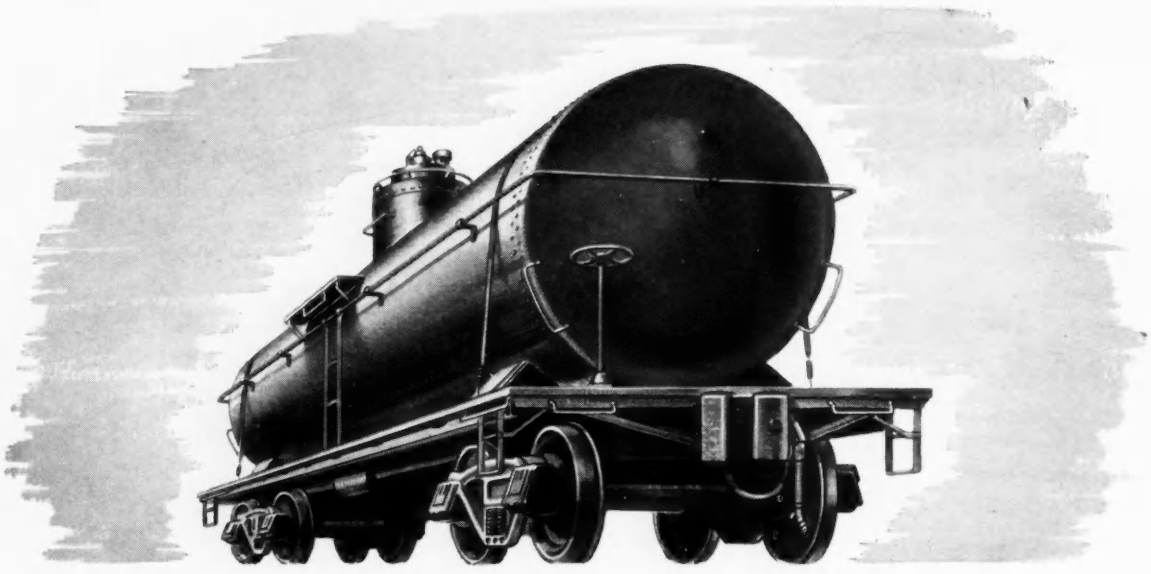


EMERY PRODUCTS FOR TEXTILES

TWITCHELL OIL

FOR WOOL

Twitchell 7410 Wool Oil and Twitchell 7420 Worsted Oil, for lubrication in carding, combing, spinning and weaving operations, are finished oils ready for use, self-emulsifying, easily scourable. Twitchell 7430 most readily scourable oil available.

FOR COTTON

Non-staining Twitchell Oil 7250 for all finishing, produces fastest rewet, softest hand. Oil 7240 for fast wetting back, medium hand.

Twitchell Oil 7231 (formerly 3X—the long established standard rewetting agent) has the least effect on hand. All three recommended for finishing regular or Sanforized fabrics, for slashing.

FOR RAYONS

Twitchell Oils 7681, 7685, 7687 adjusted to viscosity specifications, to lubricate knitting and weaving yarns and Twitchell 7620, a coning oil for nylon yarn, are non-staining, easy scouring oils. For crepe yarn soaking, Twitchell 7810 is compatible with starches, gums and other sizing agents.

FATTY PRODUCTS

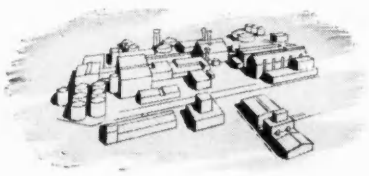
FATTY ESTERS

Emery 2210 Glyceryl Monostearate
Emery 2510 Propylene Glycol Monostearate
Emery 2410 Diethylene Glycol Monostearate
Emery 2221 Glyceryl Mono-oleate
Emery 2301 Methyl Oleate
Emery 2302 Propyl Oleate
Emery 2230 Glyceryl Trioleate
Hyfac 2130 Hydrogenated Fish Oil Glyceride

FATTY ACIDS

Emersol 120 Standard Stearic Acid
Emersols 210 & 220 Elaine (Oleic Acid)
Emersols 211 & 221 Low Titre Elaines
Emery 621 & 622 Coconut Fatty Acids
Hyfacs 410 & 420 Hydrogenated Tallow F.A.
Hyfacs 430 & 431 Hydrogenated Fish Oil F.A.

Descriptive literature—full specifications on request



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CORPOLIN®

HYGROSCOPIC AND PLASTICIZING AGENT

- Attracts and retains the proper amount of moisture in VAT PRINT PASTE.
- Assures valuable savings—costs ½ as much as glycerine, which it replaces without change in print paste formulae.
- A clear, colorless, odorless, non-volatile liquid. Free-flowing.
- NON-TOXIC and NON-FLAMMABLE.
- High uniformity. Every drum identical in quality and analysis.
- Greater hygroscopicity at lower cost. The finest humectant available at any price.

Corpolin is widely used in sizing and finishing to keep warps and fabrics in desired condition.

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Technical data sheet and samples forwarded promptly on request.

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HEYDEN CHEMICAL CORPORATION

393 SEVENTH AVENUE, NEW YORK 1, N. Y.

HEYDEN CHEMICAL CORPORATION THE AKTIVIN DIVISION NEW YORK

COCONUT FATTY ACIDS

• • • • • Trade reports all show laboratory tests of "Excellent"
• • • • • Confirmed by actual plant results. White color, fast wetting power and excellent detergency of finished products assure customer acceptance in the textile field.

A. Gross' "Special" Coconut Fatty Acids, with the major proportion of the lower acids (Caproic, Caprylic and Capric) removed, yield a product more desirable for detergent manufacturers.

RED OIL

Bland odor, low titre, low in unsaponifiables. Produced entirely from selected animal fats. Improved chemical and physical properties due to modern distillation and control.

Send for our booklet, "Fatty Acids in Modern Industry"

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FACTORY: NEWARK, N. J.

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ETHYL ACETOACETATE

$$CH_3\text{-}\overset{O}{\overset{\|}{C}}\text{-}CH_2\text{-}\overset{O}{\overset{\|}{C}}\text{-}O\text{-}C_2H_5$$

NOW! Greater Quantities for

Dyes & Pigments
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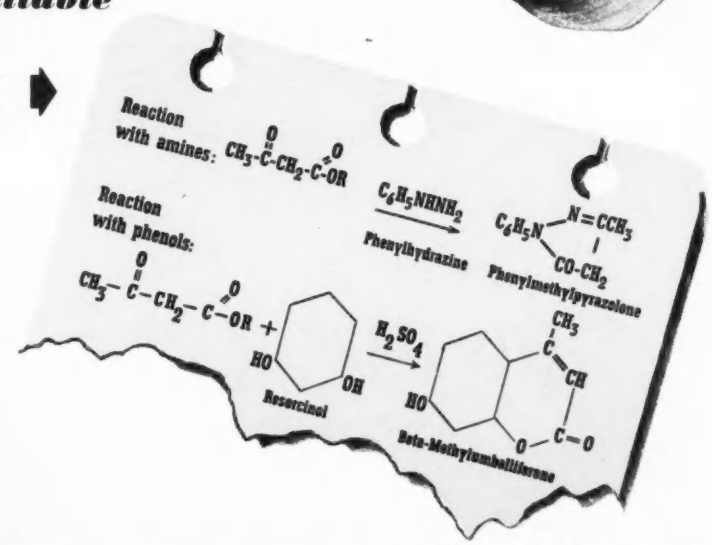
Optical Bleaches
Stabilizers

Methyl Acetoacetate

Also Commercially Available

The many possibilities of these esters are shown by these typical industrial reactions.



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CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

Offices in Principal Cities
In Canada:
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OTHER ACETOACETATES, SUCH AS BUTYL AND METHYL AMYL ESTERS, can be supplied. You are invited to call or write our nearest office for samples, prices, and additional helpful data on acetoacetic esters.

NYANZA

ANILINE & ALIZARINE COLORS

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TEXTILE CHEMICALS

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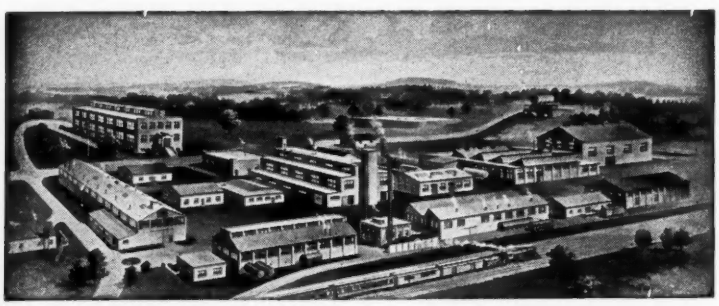
FINISHING MATERIALS

FOR

WOOL—COTTON—RAYON—ACETATE
AND MIXED FIBERS



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NYANZA COLOR & CHEMICAL COMPANY, Inc.

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Charles Albert Smith Limited, 123 Liberty St., Toronto, Canada

PERMA - PAR R

An improved cation action finish

RESISTANT TO WASHING & DRY CLEANING

REFINED PRODUCTS CORPORATION

Lyndhurst • New Jersey

Manufacturers of PERMA-CIDE, the approved, outstanding, mildew-proofing agent

Southern Representative: DYER S. MOSS, 1301 Liberty Life Bldg., Charlotte, North Carolina

New England Representatives: E. L. LEGG, P. O. Box 597, Providence, R. I.
CLARENCE E. MOSS, 19 Wilson Ave., Rumford (14), R. I.
CARBIC COLOR & CHEMICAL CO., INC., 60 Pine St., Providence, R. I.

California Representative: SIDNEY SPRINGER, 2200 S. Vermont Ave., Los Angeles 7, California

Canadian Selling Agents: Carbic Color and Chemical Co., Inc., 56 McNab Street South, Hamilton, Ontario

Exporting Agent: Chem-Cal Company, 82 Wall St., New York City.

If You Want

Permanent Softening Effects

On

Rayon • Acetate • Bemberg • or Cotton

...Write for this Onyxsan Bulletin!

IT covers the complete story of THE ONYXSANS . . . the cation-active softening agents that provide a wider variety of attractive hands than any other cationic finishes.

Effects are *permanent* on cotton, rayon, Bemberg and acetate, and show outstanding resistance to washing on all other textile fibers.

Onyxsan finishes are integral with the fibers of the goods. They are brought about by changes *inside the yarn*.

OUTSTANDING PROPERTIES OF THE ONYXSANS

- Stable to hard water, electrolytes and organic acids.
- Do not develop odors, rancidity, stiffness or mark-off.
- Substantive to textile fibers.
- Easy to apply in jig, quetsch, dye beck, padder, etc., without changes in operations.
- Provide unusual, lasting softening effects.

Drop us a line for this bulletin *now!*

onyx CHEMICALS FOR DYEING • FINISHING • PRINTING

ONYX OIL & CHEMICAL COMPANY

JERSEY CITY 2, N. J.

CHICAGO • PROVIDENCE • CHARLOTTE • ATLANTA

In Canada: Onyx Oil & Chemical Co., Ltd. Montreal, Toronto, St. Johns, Que.

For Export: Onyx International Jersey City 2, N. J.

Hooker Sulfides Are Iron-Free

For the manufacture of organic sulfides or mercaptans, your best bet is to use Hooker Sulfides. These Hooker products are remarkably free from iron and other heavy metal salts that may upset your reactions.

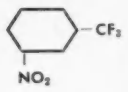
Every shipment of these sulfides is up to the same high standards of purity—with a maximum of 5 ppm Fe in Hooker Sodium Sulfhydrate and 8 ppm Fe in Hooker Sodium Sulfide.

For higher yields, a minimum of side reactions, and a purer end product you will do well to investigate high purity Hooker Sulfides.

Technical data sheets and test samples will be sent when requested on company letterhead.

HOOKER RESEARCH Presents

m—NITROBENZOTRIFLUORIDE
(m—nitrotrifluoromethylbenzene)
$NO_2C_6H_4CF_3$



TYPICAL PHYSICAL DATA

Molecular Weight	191.11
Freezing Point	−5.0° C
Boiling Point	203.° C
Distillation Range (ASTM)	200.5 to 208.5° C
Refractive Index, n20/D	1.472
Specific Gravity, 15.5°/15.5° C	1.437

Another new fluorine containing product, Hooker m—nitrobenzotrifluoride, is of particular interest as an intermediate in the preparation of dyestuffs and other fluorine containing compounds.

m—Nitrobenzotrifluoride is a thin, pale straw oily liquid with an aromatic odor. The CF_3 group is stable to further chemical reaction. The nitro group may be reduced. The product is subject to further nuclear substitution in the meta position. It is at present available in pilot plant quantities. Technical Data Sheet No. 365 describes m—nitrobenzotrifluoride more fully and is available when requested on company letterhead.

SODIUM SULFIDE (Na_2S)

DESCRIPTION:
Light yellow colored solid in flake form. Rapidly soluble in water; slightly soluble in alcohol; insoluble in ether.

PHYSICAL DATA:

Mol. Wt.	78.1
M. P.	100° C

ANALYSIS

Na_2S	60 to 62%
NaCl	1.5% Max.
Other Na Salts	2.0% Max.
Fe	8 ppm Max.
Cu, Ni, Cr, Mn, Pb	1 ppm Max.
Water of crystallization	36.5 to 34.5%

USES:
In manufacture of dyestuffs, chemical intermediates, paper pulp, special glass, soap and rubber; as an ingredient of dye liquor for textile dyeing; in calico printing, boiling out linen; desulfurizing viscose rayon; ore flotation and metal refining; in unhairing hides and wool pulling.

SHIPPING CONTAINERS:
Steel drums ..... 90 and 350 lbs. net

SODIUM SULFHYDRATE (NaSH)
(sodium hydrosulfide)

DESCRIPTION:
Light lemon colored solid in flake form. Completely and rapidly soluble in water, alcohol and ether.

PHYSICAL DATA:

Mol. Wt.	56.1
M. P.	55° C

ANALYSIS

NaSH	70 to 72%
Na_2S	0.25 to 2.5%
NaCl	0.4 to 0.8%
Na_2SO_3 and $NaHCO_3$	0.04 to 0.4%
Fe	5 ppm Max.
Cu, Ni, Cr, Mn, Pb	1 ppm Max.
Water of Crystallization	28 to 26%

USES:
As a chemical intermediate in preparation of dyestuffs and other organic chemicals such as thioamides, thiourea, thioglycolic acid, thio-and dithiobenzoic acids, sodium thiosulfate. In unhairing hides, in desulfurizing viscose rayon.

SHIPPING CONTAINERS:
Lacquer-lined steel drums ..... 90 and 350 lbs. net

From the Salt of the Earth

HOOKER ELECTROCHEMICAL COMPANY

2 UNION STREET, NIAGARA FALLS, N. Y.
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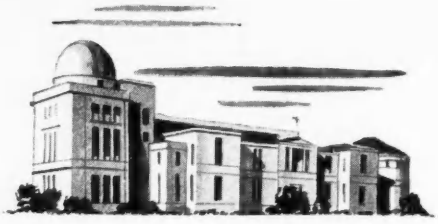
8-1070

SODIUM SULFIDE • SODIUM SULFHYDRATE • SODIUM TETRASULFIDE • CAUSTIC SODA • MURIATIC ACID • PARADICHLOROBENZENE • CHLORINE

FOR

DEPENDABLE TIME

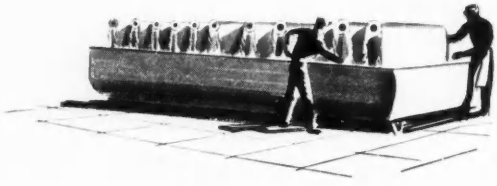
... the Naval Observatory at Washington is the *accepted standard* of the nation.



FOR

DEPENDABLE LUBRICITY

... NOPCO 1111 is the *accepted standard* of the Rayon Industry.



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CREPE SOAKING OIL AND WARP SIZE SOFTENER

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Brilliant colors . . . fast to light, laundering, chlorine and wear.

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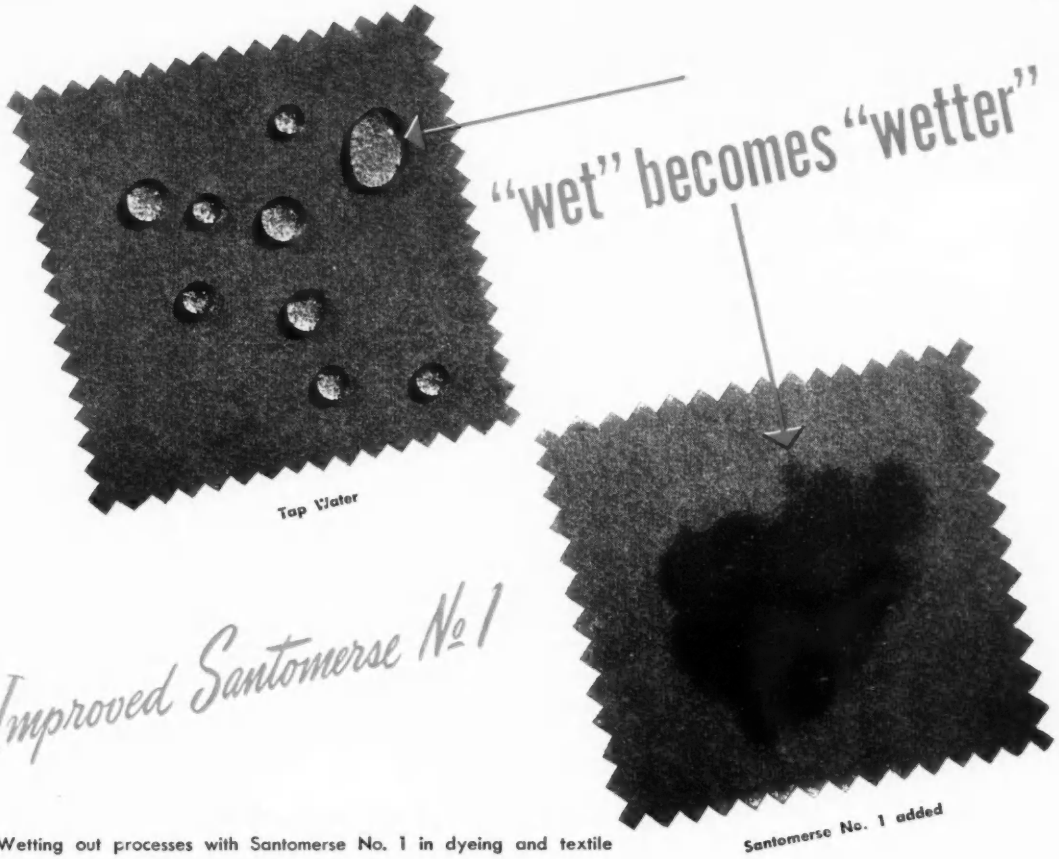

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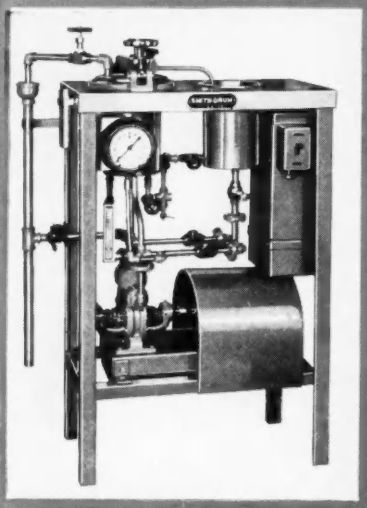
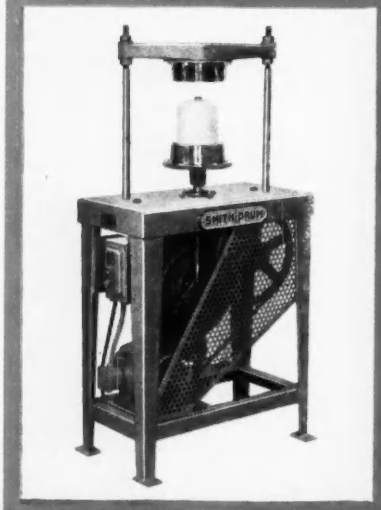
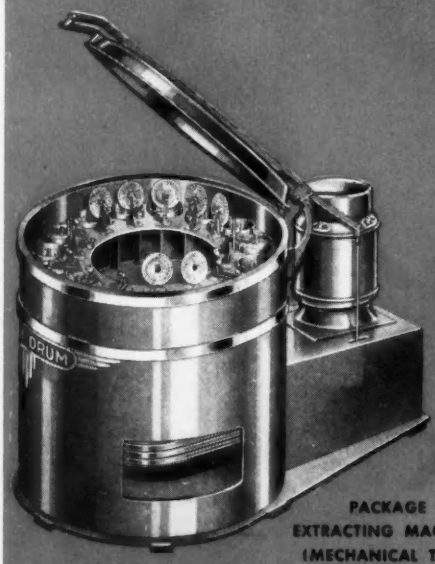


SINGLE PACKAGE DYEING MACHINE



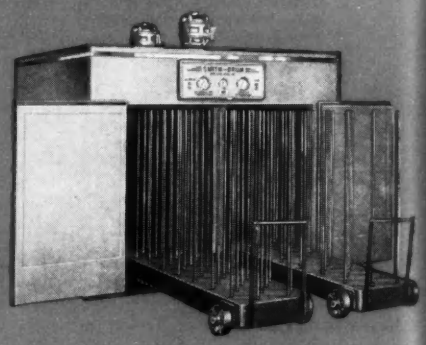
PACKAGE FORMING PRESS

THE SMITH-DRUM PACKAGE DYEING MACHINE



PACKAGE EXTRACTING MACHINE (MECHANICAL TYPE)

PACKAGE EXTRACTING MACHINE (AIR PRESSURE TYPE)



PACKAGE DRYING MACHINE (CABINET TYPE)

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For DYEING, EXTRACTING and DRYING YARN in PACKAGE FORM

Each designed to meet your own specific Local Conditions . . .

Smith-Drum offers two *complete* and *integrated* systems for preparing, dyeing, extracting and drying yarn in package form on the ⅝" diameter dye tubes. (For packages wound on the large 1⅝" dia. dye tubes Smith-Drum offers complete systems of other design). Each machine has been specially designed and built for the specific purpose of handling packages and is the result of extensive research and experimentation.

These two complete Smith-Drum Package Systems allow for variable local conditions by providing two optional types of extracting machines (mechanical and air pressure types) and 3 optional types of drying machines (cabinet, port and table types). Where mechanical extraction and cabinet drying may be ideal in one case, air pressure extraction and port blower drying may be better suited for another installation. Our representatives will discuss the advantages of each as applied to your particular needs.

The Smith-Drum system results in faster, more uniform work . . . lower costs, less labor and increased production. Every machine incorporates important advancements in operation and many exclusive Smith-Drum features. The entire system may be installed complete or individual Smith-Drum machines may be used in conjunction with your present equipment to improve the over-all efficiency of your dyehouse operation. In addition to the machines illustrated, Smith-Drum can supply air compressors and hoists to be used with this equipment. Complete information is contained in our Catalog No. PBD-801. Write for your free copy today, without obligation, of course.

SMITH, DRUM & COMPANY

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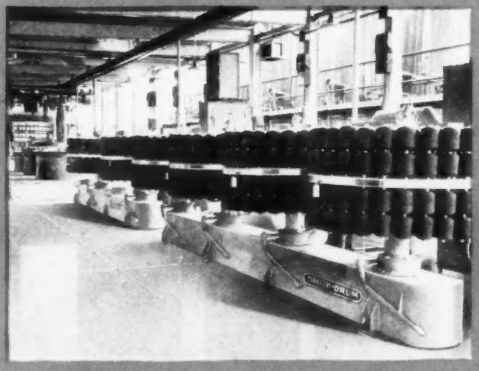
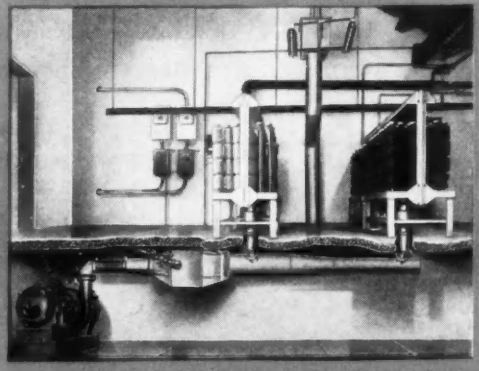


PACKAGE DRYING MACHINE (PORT TYPE)



PACKAGE DRYING MACHINE (TABLE TYPE)

PROXOL - *the New Wool Oil*

is ready with ALL the answers!

Do you choose a wool oil on the basis of its lubricating properties alone? Of course not! For no matter how efficiently an oil performs, you've got to get rid of it when you scour. And here's where many wool oils fall down. They are too hard to scour out—cause plenty of grief in bleaching, dyeing and finishing.

Proxol, like a welcome guest, knows when to leave—and does so when it should. Proxol is easily removed in scouring—with 40% to 75% savings in normal soap and alkali usage. This important Proxol quality helps assure clean goods—important in subsequent dyeing and finishing operations.

Proxol is Procter & Gamble's efficient new wool oil. It's a self-emulsifiable oil which needs no help from added emulsifiers. Has a less-than-20°F pour point. A Proxol emulsion is extremely stable—it won't separate, regardless of storage period.

Better Carding-

You can't miss seeing the excellent results of Proxol in the carding operation. Card ropings are round, smooth and uniform because of its excellent lubricating properties. Stripping is reduced.

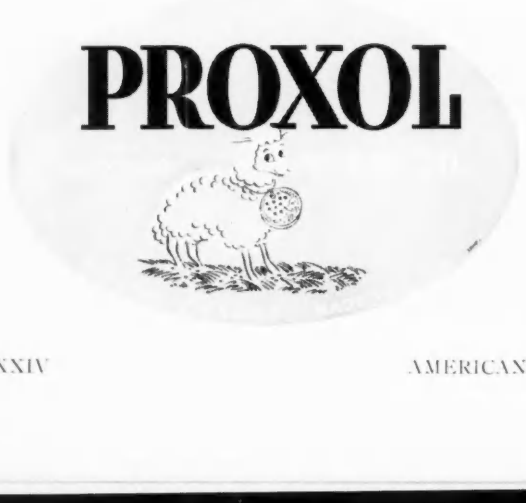
Procter & Gamble

Cincinnati, Ohio—Makers of Olate the universal low titer textile soap

Better Spinning-

Good results are equally apparent in spinning. Yarns spun with Proxol are uniform in weight and unusually strong because Proxol provides the good lubrication and controlled cohesion so necessary for good yarn. Better moisture retention, a built in feature of Proxol, also helps improve carding and spinning. This is especially noticeable when operations are resumed after a week-end shut down. Fewer ends are down and piecing is minimized.

Proxol is proving itself a superior wool oil in a steadily increasing number of important woolen mills. It will pay *you* to standardize on Proxol.



CALCO *dyelines*

PUBLISHED BY *AMERICAN Cyanamid COMPANY* CALCO CHEMICAL DIVISION
Bound Brook, New Jersey
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PARIS OPENINGS FEATURE BLUES, BROWNS*

Important Fabric Colors for Next Spring, Fall

Color trends, as revealed in the Paris fashion showings held in August, promise to influence color selections in fabric designs for many months to come. For this reason, they should be of interest to all who are concerned with color in textiles.

While no single color dominated all of the many showings, the largest single color grouping was the blue family, in a range that included navy, sapphire, royal, French blue, sky blue and aqua. Dior singled out blue as his most important color, showing it repeatedly in day, afternoon and evening wear, either as a monotone or in iridescent effects combined with black or brown.

Supplementing the preference shown for blue, a trend away from the muted, grayed shades currently popular was evident everywhere. Colors were brighter, clearer, truer, with primaries forming the basis for the new shades. Molyneaux and Balmain favored red to a marked degree, the latter selecting Basque Red for special prominence. Like the blues, reds appeared in a wide range, going from deep shades to intense flame reds and magenta. For the most part, yellows were clear, too. These were prominent in combination with black at Piquet.

The family of browns, ranging from dark shades to beige, is another color group scheduled for a comeback after a prolonged absence in favor of grays and greens. And again, while the browns did not by any means obliterate the grays and greens, their prominence in the Paris showings indicates that they will score heavily, along with blues, in Spring and Fall color selections.

*Reported direct from Paris by a Calco representative.

New Vat Printing Brown Has Excellent Light-Fastness

Calcosol† Copper Brown Printing Paste is a new vat printing brown designed for use on cotton and rayon. It has exceptionally good fastness to light even in light pastel shades, as well as excellent fastness to washing, chlorine, Plissé, perspiration, and hot pressing. These properties make it very desirable for the printing of draperies and shirts.

Calcosol Copper Brown Printing Paste is recommended especially for light to medium shades, as it retains its redness and richness of tone even in pastels. Other vat printing browns usually go greener or duller in light prints.

This dye is especially effective in producing dusty rose shades, and it acts as a shading element in grays. Very fast-to-light dusty rose shades are produced with this dye when applied straight, and also when shaded slightly with other fast-to-light printing vat dyes.

A range of very fast printing grays can be produced by using Calcosol Gray 2GP Paste with Calcosol Copper Brown Printing Paste, or by shading this combination slightly with Calcosol Blue CCP Double Paste or Calcosol Violet BN Extra Paste. †Trade-mark.

More Dyes . . . Better Dyes

According to the U. S. Tariff Commission, production of dyes in this country totaled a new high record of 212,156,000 pounds, as compared to 186,000,000 pounds in 1946. The record is significant in view of the shortages of some coal-tar intermediates and inorganic chemicals which existed last year.

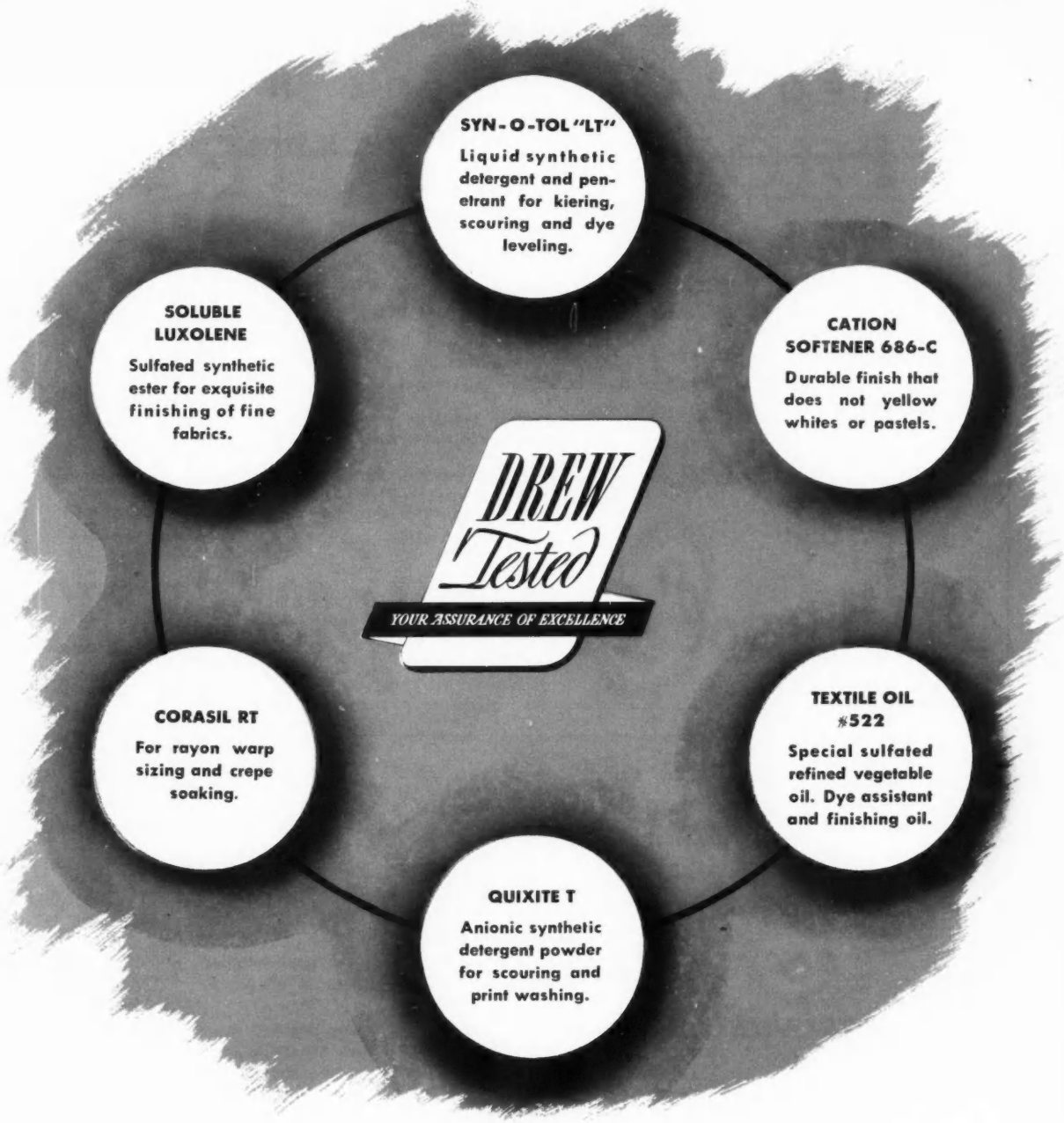
Of the 1947 total, 28.7% consisted of vat dyes, 20.5% direct dyes, 19.7% sulfur dyes and 11.0% acid dyes. The remainder consisted of mordant and chrome, azoic, basic, acetate, rayon, lake and spirit-soluble dyes.

Dye imports for the same year totaled 797,348 pounds (actual weight), valued at $2,025,800—a notable decline from the 962,000 pound total of 1946. Of the 1947 imports, most of them were supplied by Switzerland, with England, France, El Salvador, Denmark, Canada and Belgium supplying the remainder.

FOR THE TEXTILE BOOKSHELF

Calco Technical Bulletin No. 799—"A Study of Fluorescent Dyes." An up-to-date report on a study of fluorescent dyes; contains pertinent data about the properties and applications of fluorescent dyes.

There are approximately eleven miles of railroad tracks at Calco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Durable finish that does not yellow whites or pastels.
TEXTILE OIL #522
Special sulfated refined vegetable oil. Dye assistant and finishing oil.
QUIXITE T
Anionic synthetic detergent powder for scouring and print washing.
CORASIL RT
For rayon warp sizing and crepe soaking.
SOLUBLE LUXOLENE
Sulfated synthetic ester for exquisite finishing of fine fabrics.
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Wide Range of use is Big Feature of

Indigosol* Golden Yellow IGK

*Reg. U. S. Pat. Off.

THE present price of Indigosol Golden Yellow IGK makes possible the use of this very fast Indigosol for economical dyeing and printing operations.

In combination with Indigosol Green IBA, very fast green shades are now available to the printer and dyer for the first time at a very reasonable cost.

An excellent printing color on cotton and rayon, it is also of great interest to the dyer of cotton, rayon and wool.

In ease of application, the perfectly level shades obtained, and the unusually excellent penetration of heavy goods makes the entire line of INDIGOSOLS especially valuable to the fast color dyer or printer.

Brightness and Economy are Characteristics of

Pharmasol* Golden Yellow N

*Reg. U. S. Pat. Off.

PHARMASOL Golden Yellow N produces clear, bright, fast and economical golden yellow shades when printed on cottons or rayons.

When mixed with Pharmasol Red RN, a complete range of Gold Shades can be obtained.

PHARMASOLS are solutions of stabilized azoic dyes and adjusted to the most practical concentration which can be easily applied with a maximum of efficiency.

PHARMASOLS solve the problem of troublesome dissolving and the uncertainties thereof—and as there is no decomposition there can be no loss of material or value.

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NOVEMBER 15, 1948
VOLUME 37 NUMBER 23

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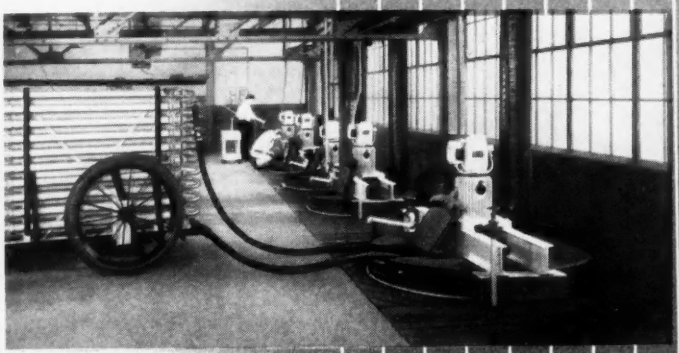

This unique, ultra modern PYREX Heat Exchanger is a portable piece of equipment through which is pumped the fluids to be heated or cooled.

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Many metals contaminate your finest dyestuffs causing spots on the finished dyed fabric. To eliminate this "risk" for you we've even gone so far as to have our own special and exclusive Heat Exchanger made of GLASS. Yes, the magic material known as "Pyrex" has replaced metals in Althouse PRECISION Dye-Making, so that dyestuffs NEVER come in contact with any corrosive metals while in the wet stage.

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pace-setter in precision dye-making

Proceedings of the
American Association of Textile Chemists and Colorists

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November 15, 1948

OVER 1,000 ATTEND AUGUSTA NATIONAL CONVENTION

THERE was a total registration of 1025 persons attending the Augusta National Convention, Augusta, Georgia, on October 21-23. This included the following representation from the various sections:

Northern New England	42
Rhode Island	45
Southeastern	105
New York	179
Piedmont	297
Western New England	7
South Central	49
Philadelphia	143
Mid-West	45
Students	4
Ladies	96

There were also several persons present from Canada, England and Sweden.

A number of members arrived a day before the convention officially opened and Thursday morning saw the arrival of a special train from the North carrying over 200 delegates. This train was welcomed at the station by the Mayor of Augusta and by a brass band featuring six majorettes. The delegates proceeded to their hotels in a number of busses provided for the occasion.

The theme of the Convention "Advancing Textiles Through Research" was apparent in the entire technical program which started on Thursday afternoon and concluded with the Intersectional Contest on Saturday morning.

A dinner honoring corporate and charter members of the Association was presided over Thursday evening by President Henry F. Herrmann. On the program for the evening was an address of welcome by Major General Raymond O. Barton, a tribute to Alfred P. Howes by Dr. Louis A. Olney (see *Proceedings* for November 1st), "AATCC Contributions to Industry" by Henry F. Herrmann, "The Importance of Cooperative Research" by J. Robert Bonnar, and "Corporate Membership Plans" by Emmett J. Driscoll. A feature of the evening was the presentation of the Olney Medal to Harold M. Chase by President Herrmann with remarks on the Medalist by William B. Carroll, Jr. and P. J. Wood and an address by the Medalist.

Friday evening another dinner was held which featured a general meeting of the National Research Committee, with J. Robert Bonnar, Chairman of the Committee, presiding. A number of committee chairmen presented progress reports.

The final event of the Convention was the annual banquet with Samuel L. Hayes presiding as Toastmaster. On behalf of the three Southern Sections, he presented an engraved watch to Douglas C. Newman, General Convention Chairman, who responded by pointing out the very efficient committees he had assisting him in preparing and planning for the Convention. Patrick J. Kennedy, Chairman of the National Intersectional Contest Committee, introduced Dr. Louis A. Olney, "Chief Justice" of the Panel of Judges for the Contest, who named the following winners:

1st—Piedmont Section.
2nd—Northern New England Section.
3rd—Philadelphia Section.

President Herrmann reported briefly on the state of the Association and was followed by Hugh M. Comer who spoke on the topic "Eleven Times Ninety-Six Cents is Greater Than Ten Times a Dollar". In his own inimitable style, interspersed with much levity, Mr. Comer carried out the serious theme of his message.

On Saturday noon a broadcast over the Augusta Mutual Broadcasting System station was conducted and consisted of a round-table discussion of how the consumer benefits from the standard test methods. Participating in the broadcast were Dr. Louis A. Olney, Henry F. Herrmann, Charles W. Dorn, Miss M. A. Falcone and Miss Helen Thackeray.

A special program had been arranged for lady guests at the Convention and included a banquet Friday evening following which Arthur Thompson presented a program of magic feats.

The exhibits of apparatus developed by the Association's research committees attracted considerable attention throughout the Convention and members of the research staff at the Association's Laboratories at Lowell Textile Institute, under the direction of Dr. Harold W. Stiegler, Director of Research, were on hand to explain the apparatus.

The consensus of opinion was that this Convention under the auspices of the three Southern sections, Southeastern, South Central and Piedmont, was an outstanding success and certainly the attendance was the largest of any AATCC convention held in the South. The arrangements were evidence that the various committees had spared neither time nor effort to produce a smooth running convention that was a credit to them as well as to the whole Association.

The first of the technical papers are published in the *Proceedings* in this issue. Other papers will be published as rapidly as received as well as reports of the various dinner meetings and the radio broadcast.

—◆ ◆—

Correspondence with ASA

AMERICAN ASSOCIATION OF TEXTILE CHEMISTS AND COLORISTS

September 29, 1948.

Admiral G. F. Hussey, Secretary,
American Standards Association.
Dear Admiral Hussey:

It was a pleasure for me to make your acquaintance and in keeping with my

promise I am sending to you, under separate cover, a copy of the 1947-1948 TECHNICAL MANUAL AND YEAR BOOK of the American Association of Textile Chemists and Colorists. This volume contains the AATCC official standards and testing methods, in addition to a lot of other material which relates to the Association's many activities.

We now have eleven Sections which cover the textile centers of the entire country, and our membership is nearing the 6,000 mark. We are proud of our Corporate Membership which is well over 300, and includes the ranking concerns in the textile processing, dyestuff and auxiliary chemical fields.

A rather unique feature of our Association is its very large Research Committee and the standing research committees which have permanent assignments on weighty problems that concern the industry. Our competence in the handling of these assignments is established by the fact that the Association comprises the technical personnel of the industry which, under the Association's cloak, is thereby privileged to work in unison without regard to competitive considerations.

We have no political ambitions nor do we indulge in any programs of a benevolent nature in behalf of our membership. Our social activities are merely the by-products of the scientific meetings which are held periodically in our various Sections, and annually in our general Conventions.

The AATCC is committed to a study of the standardization of everything pertaining to the wet processing of textiles, which includes dyeing, printing and the many finishes on all the fibers which are in commercial use. Insofar as these operations are under scrutiny by ISO for the applicability of international standards, we offer our facilities as the recognized workshop and voice of the operating personnel of the textile industry.

Sincerely yours,
H. F. HERRMANN,
President.

* * * *

AMERICAN STANDARDS ASSOCIATION

September 30, 1948.

Mr. Henry F. Herrmann, President,
American Association of
Textile Chemists and Colorists.
My dear Mr. Herrmann:

Many thanks for your letter of the 29th with its explanation of the American Association of Textile Chemists and Colorists. I must admit that my knowledge of the scope of your association and its work was definitely less than precise and I am delighted to have authoritative information.

I had, however, some contact with the AATCC through Mr. Appel of the Bureau of Standards and Bob Bonnar, with whom I had the pleasure of serving on the American delegation to the Buxton conference in June.

It is a pleasure to have your assurance as to the readiness of the AATCC to cooperate within its field in the international standardization of textiles.

The Technical Manual and Year Book is a splendid publication and I am delighted to have a personal copy.

Sincerely yours,
G. F. HUSSEY, JR.,
Secretary.

—♦ ♦—

Meeting of Clemson College Student Chapter

AT a meeting on October 4th, Douglas K. Seaborn was elected Chairman; Avery F. Garrison, Vice Chairman; Joseph P. Clancy, Secretary; and Jerome Wilson, Jr., Treasurer. Mr. Garrison, John Withington and Mr. Clancy were appointed chairmen of Program, Initiation and Membership committees, respectively. Thirteen new members were received. Plans were completed for a fish fry on October 14th.

Respectfully submitted,
JOSEPH P. CLANCY, *Secretary.*

—♦ ♦—

Meeting of Rhode Island Section

A MEETING of the Rhode Island Section was held on Friday, Oct. 15, 1948, following a dinner in Johnson's Commodore Room, and was attended by over 200 members and guests.

Two excellent papers were delivered by Dr. G. W. Van Benschoten, a nationally recognized opthalmologist, and F. J. O'Neil, Chief Physicist for the Pacific Mills.

A question and answer period followed the papers.

Respectfully submitted,
E. A. RICHARDS, *Secretary.*

—♦ ♦—

October Meeting, LTI Student Chapter

THE October meeting of the Lowell Textile Institute Student Chapter was called to order by Chairman Gardner.

The Seminar programs to be presented during the coming year were discussed.

Committees for the year are as follows:

Program — Ludwig Rebenfeld, *Chairman.* Gabrielle Lemire, Robert Morrison.

Membership — Lawrence McMahon, *Chairman.* Vincent McKone, Dorothy McCarron, Earl Wilbur.

Publicity—William Reines, *Chairman.* Gaston Majeune, Daniel Kashak.

Bylaws — Daniel Callahan, *Chairman.* Michael Besso.

Respectfully submitted,
JOAN L. GREGG, *Secretary.*

—♦ ♦—

Membership Applications

SENIOR

Thomas W. Kitchen—Supt. of Finishing Mill, Dan River Mills, Inc., Danville, Va. Sponsors: A. H. Gaede, D. S. Quern.

Rennold V. Kuttruff—Chemist, Susquehanna Mills, Inc., Sunbury, Pa. Sponsors: F. R. Byrod, A. C. Tressler.

Arthur W. LaCouture—Chemist, Archer Rubber Co., Milford, Mass. Sponsors: R. B. Taylorson, B. B. Meady.

(Continued on Page P744)

EMPLOYMENT REGISTER

This column is open for four insertions per year, per member, without charge. Blanks can be obtained from, and filed with, the Secretary of the Association, Lowell Textile Institute, Lowell, Mass. It is understood that these will be open to inspection by prospective employers, who can obtain further information from the Secretary.

48-13

Education: PhD, physical chemistry.

Experience: Research chemist and laboratory director; synthesis of finishing materials and detergents; several publications.

Age 38; married.

11-1, 11-15, 11-29, 12-13

CALENDAR

PHILADELPHIA SECTION
Meeting: January 28, 1949 (Kugler's, Philadelphia.

NORTHERN NEW ENGLAND SECTION
Meeting: November 19.

SOUTHEASTERN SECTION
Meeting: December 4 (Atlanta, Ga.).

WESTERN NEW ENGLAND SECTION
Meetings: December 3, January 14, 1949, February 25, April 8, May 20.

NEW YORK SECTION
Meetings: November 19, January 28, 1949, March 4, April 1, May 6.
Outing: June 17.

COUNCIL
Meetings: January 28, March 25, 1949 (Hotel New Yorker, New York).

RESEARCH COMMITTEE
Meetings: January 28, March 25, 1949 (Hotel New Yorker, New York).

163rd COUNCIL MEETING

THE Council held its 163rd meeting in the Hotel New Yorker, New York, N. Y., on Friday morning, September 24, 1948. Present were President Henry F. Herrmann, presiding; John N. Dalton and C. Norris Rabold, Vice Presidents; J. Robert Bonnar, Chairman of the Research Committee; William D. Appel, William H. Cady, Carl Z. Draves, Louis A. Olney and P. J. Wood, Past Presidents; Raymond W. Jacoby, Fred R. Tripp and George H. Wood, representing Rhode Island; Harold H. Taylor, representing Western New England; George L. Baxter, Charles W. Dorn, Herman E. Hager and William A. Holst, Jr., representing New York; Elmer C. Bertolet, Arthur W. Etchells, Lloyd O. Koons and Percival Theel, representing Philadelphia; Leland G. Atkins and Raphael E. Rupp, representing Piedmont; Kenneth H. Barnard, Chairman of the Convention Committee; Miles A. Dahlen, Chairman of the Technical Program Committee; Emmett J. Driscoll, Chairman of the Corporate Membership Committee; David O. Hammer, Jr., representing the proposed Mohawk-Hudson Section; Patrick J. Kennedy, Chairman of the Intersectional Contest Committee; Leonard S. Little, Chairman of the President's Advisory Committee; Paul J. Luck, Chairman, and George H. Schuler, Vice Chairman, of the Publicity Committee; J. Edward Lynn, Chairman of the Western New England Section; and Harold C. Chapin, Secretary.

The Secretary's report of the 162nd Council meeting and financial report of September 21, and a report from the Treasurer on investments by the Appropriations Committee, were accepted. The amendments to the Bylaws proposed at the 162nd meeting were reported adopted by letter ballot.

Resolutions in memory of Alfred Pettis Howes were offered by P. J. Wood and adopted.

Mr. Bonnar reported for the Research Committee and the Executive Committee on Research, and on the International Textile Convention in Buxton, England. The report on dyeing of O.D. shade number 7 upon cotton had gone to the Quartermaster's office, with hope of eventual publication. Work on a more drastic wash fastness test was continuing, with intent of duplicating current laundry practice, but with difficulty in establishing a mean among widely varying treatments in commercial laundries. Work on a new perspiration test, using the plate method in a new piece of apparatus, was nearing completion. Three of the new model detergency machines would be ready for trial in a few weeks. The Committee on Fastness to Rubbing had been reactivated to consider suggestions from the British Society of Dyers and Colourists for accessories to the Crockmeter. There was evidence of increased interest of the Federal Trade Commission in tests and standards, and of growing cooperation of other associations in their development. Six new problems under consideration included a possible study of stainless steel equipment in collaboration with its manufacturers. New tests would have to be developed rapidly to fill requirements of the new *Colour Index*. With the help of Dr. Draves, descriptions of tests in the 1948 *Year Book* had been systematized, with comparable numbering of grades for all tests.

The Buxton Convention had been disappointing in lack of planned consideration of color fastness tests, but had led to the starting of conferences on three sets of tests. On the *Colour Index* the trip had been wholly satisfying, leading to quick agreement with the British Society of Dyers and Colourists on debated principles of editing. Mr. Appel reported further on the Convention and *Colour Index*, mentioning also favorable comment abroad on practical information in the *Reporter*.

Mr. Cady described the Buxton agreements on the *Colour Index*, which received the approval of the Council. These provide for unrestricted publication of such information on foreign dyes as had already appeared in published government reports, but for reservations by a manufacturer in furnishing information on a dye made only by himself.

Mr. Luck, appointed the new Chairman of the Publicity Committee, discussed his plans; and Mr. Schuler, Vice Chairman, described excellent publicity given to proceedings of recent Council and Research Committee meetings through his own efforts.

Mr. Driscoll announced the opening of a campaign by the Corporate Membership Committee to increase Corporate members fifty percent, and contributions of present members fifty percent.

For the Publications Committee Dr. Olney showed the 1948 *Year Book* in its new form, which was approved for the 1949 volume. The new *Analytical Methods* edited by Professor Theel's committee were reported ready for publication in form similar to earlier year books. For the second monograph, on vat dyes, Henry A. Rutherford had been appointed Editor, and Raymond W. Jacoby, Chairman, of a committee to decide on contents and organize collection of material.

Mr. Barnard reported on final arrangements of Mr. Newman's committee for the Augusta convention, and on letters about to be mailed by the railroads confirming reservations of members for the two special trains from New York. Dr. Dahlen reported eighteen papers accepted for the general technical program, some of them already available for early printing after the convention; and a surplus of papers which might perhaps be available for Section meetings. Mr. Kennedy reported most of the Intersectional Contest papers already received, and others on the way.

On recommendation of the Research Committee, the test involving the Rain Tester was changed from a tentative to a standard method, and a shrinkage test for wool piece goods proposed by the Committee on Dimensional Changes was made a tentative method.

For the Committee on Membership and Local Sections, Mr. Rabold presented a petition for authorization of a new Section in the Mohawk and upper Hudson River valleys. A preliminary meeting of 132 members of the group in Albany, a week earlier, was described by Mr. Hamer and the Secretary. Organization of the Section was approved, with Dr. Jack Epelberg Secretary *pro tem*. Mr. Rabold's committee, augmented by C. W. Dorn, J. E. Lynn and D. O. Hamer, Jr., was asked to recommend name and boundaries.

Elected to Corporate membership were the Erwin Cotton Mills Co., Robert B. Grady Co., Scholler Brothers, Ltd. of Canada, Sterling Dyeing and Finishing Co., and Virginia Smelting Co. Each of the following was elected to the class of membership specified, as of thirty days from publication of application, provided

SECRETARY'S FINANCIAL REPORT—SEPTEMBER 21, 1948

Received and transmitted to Treasurer.	*Applications*	*Dues, regular & reinstate*	*Dues, Corporate & Sustaining*	*Miscellaneous*	*Totals*
August 1, 1947 to May 6, 1948	$3,840.50	$32,952.00	$35,190.00	$43,843.02	$115,825.52
May 6 to July 31, 1948	1,147.50	271.50	417.50	15,590.21*	17,426.71
Total in fiscal year ended July 31, 1948	4,988.00	33,223.50	35,607.50	59,433.23	133,252.23
August 1 to Sept. 21, 1948	481.00	101.50	400.00	2,364.15**	3,346.65
Leaving deposited by Treasurer with Secretary,					7,081.97

	*	**
Miscellaneous items		
Dividends	208.40	39.80
Chemical Warfare Service	12,841.95	
American Viscose Scholarship		1,500.00
Royalties, Flammability Tester	32.00	
Royalties, Launderometer		110.00
Royalties Multifiber cloth	74.80	
Reporters and reprints	29.00	1.50
Year books	181.00	176.15
Analytical Methods	2.00	2.00
Crockmeters	638.00	112.00
Crock cloth	362.57	215.75
Moth cloth	441.75	20.00
Dyed standards	77.90	46.00
Knitted tubing	90.75	35.00
Gas Fading Units	58.00	32.50
Water test apparatus	144.50	33.50
Color transfer charts	60.00	40.00
Buttons	10.00	
Colour Index	336.00	
Dry cleaning kit	3.00	
	15,591.62	2,364.20
Less bank charges	1.41	.05
	15,590.21	2,364.15

no objection be received meanwhile by the Secretary.

Senior

E. L. Addington
C. E. Allard
M. J. Anderson
C. R. Blumenstein
C. H. Benbrook
R. D. Berry
C. K. Bishop
A. C. Boudouy
G. L. Boney
H. W. Boyd
J. K. Boykin
W. Brothers
A. S. Callaghan
G. V. Carrette
K. E. Chambers
W. F. Coleman
H. W. Curtis
N. N. Dastur
L. F. Dowling
E. J. Dziadosz
R. D. Easdon
D. G. Ebenhack
D. H. Edminster
W. S. Fair
C. M. Fehr
H. M. Fieger
E. K. Flynn
E. E. Forster
E. G. Frick
A. E. Ginter
C. G. Gomeringer
T. M. Harris
J. T. Hasty, Jr.
T. G. Hawley, Jr.
G. R. Henkel
K. D. Henry
A. N. Heyn
H. B. Hollander
B. L. Hornby
O. W. Howe
J. O. Hugenschmidt
D. M. Jenkins
H. O. Kauffmann
H. Kohn
O. W. Kramer, Jr.
E. B. Law
T. LeSavoy
H. Levitt
H. K. Liffmann
R. A. Lyons
J. Maas
S. Machlis
R. J. Manning
C. F. Martin, Jr.
X. J. Maurer
C. P. McClelland
J. L. McIntyre
A. H. McKenzie
W. E. McMann
J. M. Mele
C. T. Mentzer, Jr.
E. B. Michaels
R. Mishell
M. S. Morse
R. B. Mulcrone
H. E. Norton
E. J. Paquette
J. Patterson
S. Y. Peng
E. J. Poh
P. W. Reeves
H. M. Rennoe
W. E. Robinson
T. S. Rowland, Jr.
A. E. Roy
J. G. Ryan
H. Seligman
J. T. Shannon
P. M. Shonk
H. Simon
E. G. R. Sjoklint
H. A. Smith
H. H. Smith
C. M. Standart
J. M. Straley
J. W. Sutton
A. W. Thomson
J. P. Thompson
E. E. Turnbull
B. C. Wall
F. F. Weglowski
C. A. Williams
J. R. Williams
H. Zafos
F. Zeissig

Junior

P. J. Bosco
J. F. Crvarich
I. Daniels
A. DeMaria
J. E. Hathaway
R. W. Jakubek
T. N. Madden
F. Schlaeppi
F. J. Tursi
A. I. Wolpert

Associate

W. R. Adams
A. E. Armstrong
W. J. Ashworth
H. C. August
W. Brown
G. F. Catlett
T. K. Chay
A. G. Cox
N. J. Delville
R. E. Dunning
K. P. Geohegan
W. W. Gleadall
D. R. Greene
B. Gylfe
W. C. Haas
E. A. Hansen
B. W. Hayward
R. B. Hill
A. W. Horton
W. F. Hummel
C. E. Hunter, Jr.
R. A. Hutzelman
C. J. Kellogg
H. C. Khatiwala
C. G. Klotzberger
H. F. Koll
M. S. Lider
J. B. Little
J. O. Logan
P. A. Massetti
L. Mauro
R. S. McDougall
E. J. Mendell
M. S. Pendleton
E. A. Poore
J. J. Singer
J. R. Taylor
H. R. Thompson
H. F. Tingley
J. G. Waywell
H. H. Weldon

Student

K. G. McKenzie
S. L. Soo
W. B. Sutherland, Jr.
J. E. Townsend
R. R. Walker

Transferred from other classifications to Senior membership were:

H. M. Hunter, Jr.
A. H. McKenzie, Jr.
M. P. Mulqueen
C. T. Schaub
A. H. Seitz
H. K. Woo

Respectfully submitted,
H. C. CHAPIN,
Secretary

Membership Applications

(Continued from Page P742)

James H. Langston—Assoc. Professor, Clemson College, Clemson, S. C. Sponsors: H. C. Chapin, J. Lindsay, Jr.

Oscar T. Lankford—Dyer, Dixie Mercerizing Co., Chattanooga, Tenn. Sponsors: W. G. Agnew, S. C. Smith.

Robert S. Mayston—Head Dyer, Sutex Ltd., Richmond, Australia. Sponsors: W. Olpinski, A. D. J. Piesse.

John T. McGuire—Gen. Supt., Jamestown Worsted Mills, Inc., Jamestown, N. Y. Sponsors: D. P. Knowland, H. C. Spatz.

Frederick H. Myers—Color and Plisse Depts., Clearwater Finishing Co., Clearwater, S. C. Sponsors: G. O. Linberg, J. L. Wyman.

Thomas F. O'Malley—Dyer, General Dyeing Co., Inc., Indianapolis, Ind. Sponsors: L. Hoehn, Jr., T. J. Ratajczak.

Joseph C. Ostle—Chief Chemist, Ferguson Bros., Ltd., Carlisle, England. Sponsors: M. R. Fox, H. B. Brien.

John Milton Panetti, Jr.—Tech. Repres., Becco Sales Corp., Charlotte, N. C. Sponsors: D. S. Quern, J. R. Hopkins.

Charles H. Ross—Tech. Director, Bensing Brothers & Deeney, Philadelphia, Pa. Sponsors: D. G. Carmichael, J. M. Gray.

Jacob B. Shoban—Pres., Valley Color & Chemical Co., Inc., Nawark, N. J. Sponsors: C. A. Funke, S. M. Frogala.

Robert R. Smith—Dyer, Stimpson Hosiery Mills, Inc., Statesville, N. C. Sponsors: H. H. Field, R. D. Sloan.

Irwin W. Spiegel—Vice Pres., International Looms, Elizabeth, N. J. Sponsors: J. P. Bauer, R. W. McGaughey.

(Concluded on Page P760)

Printing Group Meeting—

TEXTILE PRINTING: SKILL OR MYSTERY?*

ELLIOT BROADBENT

Glenylon Print Works

THE answer to this question is very easily obtained. If you were to ask any printer, I am sure that he would tell you that printing is one of the highest skills. If you ask anyone else from the manager down, I am equally sure that he will tell you that printing to him is one of the greatest mysteries on earth. Even the printers will not deny that there is an element of mystery in their calling; almost any printer will tell you that if he gets away on a bad start on Monday morning, he will have bad luck all week long. While he does not believe in fairies or such, I am quite sure that any printer knew about Gremlins or their prototypes long before the airplane industry was ever thought of.

Suppose we take a look at some of these mysteries and see if they can be explained away in the light of more reasoning. Let's go back a few years before the advent of chrome plating copper rollers. Discharging of direct and developed grounds with white or vat colors has been going on for at least twenty-five years. Every one familiar with this line of work also is very familiar with the troubles encountered in the old days which were known as caustic rips, or just plain rips. To the best of my knowledge, no one ever found out what caused them and I do not believe anyone ever found out how to remedy them. The strange thing about these rips was that sometimes the print shop would go for days without even encountering one; then, out of a clear sky, rips would occur, possibly in one machine, then followed by others in rapid succession. Everything possible was done to avoid the condition, but the cause seemed to defy discovery. One of the mysterious factors was that sometimes the same pastes and similar patterns would be in different machines; one machine would be running into trouble with rips and other machines would not. One day one of our bright chemists had the idea of straining the color and examining the residue after straining. He suspected that some of this residue was pieces of metal, and he ran through a magnet and found a great number of steel particles sticking to his magnet. He had the paste re-strained and then found that it was absolutely clear; so the paste was put back in the printing machine and the machine started up without any trouble; at least for half an hour, after which the copper started to rip again. So the paste was once again strained, and once again it was found to contain steel particles. Well it was not much of a puzzle as to where this steel could come from—it simply had to come from the doctor blade and, of course, at a time when rips were present the doctor blade was usually damaged anyway. So the next problem was to find out how could pieces of the doctor blade get into the color. This problem remained unanswered for some time, and then finally a chemist with a flare for physics decided that the combination of copper roller, steel doctor blade and printing paste made up a battery, and that current was being passed through. The next thing to do was to secure a milli-ammeter and see if there was an appreciable amount of current. Surely enough, a current was formed and was constantly passing between the copper roller and the doctor blade. Well that seemed as though a solution of the problem should be right at hand, so it was decided to ground the doctor blade and the copper roller separately. This was done and the rips stopped. What better answer could you have than that? Certainly that took all the mystery out of the problem. This was allowed to go on for two or three days and then the grounds were removed, and the pattern continued to print without any rips. So what was the answer? To the best of my knowledge, we never did find the answer to that problem. Some one had another idea of coating the copper roller with a solution of sodium sulfide, thus making a skin of copper sulfide on the surface. It was hoped that this skin of copper sulfide would be a protection against the caustic rips. All we ever found it to do was to discolor the roller, and in turn flatten out the prints to some extent. This treatment of sodium sulfide was known as giving the roller the "hoky-poky"—actually it should have been known as "hocus pocus" because that is what it was really. Then, finally someone conceived the bright idea of having the surface of the copper harder than the doctor blade. This was brought about by chrome-plating the copper roller, and after that the effect of rips was not felt. I think this phenomenon could go down in the realms of mystery.

Back twenty-five or more years ago, padding discharged grounds after printing was unknown, and there is no doubt that millions of yards of discharged grounds were printed and aged successfully. I must admit that in some cases a slight facing took place, but generally not enough to be objectionable. Sometimes as a precaution against facing, a slight amount of chlorate of soda was padded onto the goods prior to printing. Then someone discovered the idea of padding with an oxidizing agent after printing. From that time on, no printer has been able to do successfully discharge work without padding after printing. No doubt this is an instance of a loss in skill. Probably the only mystery about the above is what happened to the skill.

One morning we were about to start on a pattern which had printed successfully many times. While the pattern was quite close fitting, yet we had had reasonable production and very little trouble on past printings. On this particular morning the printer, the secondhand, the boss printer and the division superintendent were all hanging around the machine armed with tommy keys and the combined efforts of all these skilled men could not get the machine in fit. Everything was being tried, adding set, taking off set, increasing tension on the goods, and all the known tricks of the trade. I went up to the machine and asked the printer what was wrong. "Come back in half an hour", he said, "as soon as the machine gets used

* Presented at Printing Group Meeting, Augusta National Convention, October 22, 1948.

to the pattern it will go along all right." If I wanted to save my nerves for the rest of the day, there was only one thing for me to do, and that was to keep moving, which I did. In about an hour I came back, and the cloth was going up the flue with good speed. I asked the printer what had happened. He said, "I told you that as soon as the machine got used to the pattern it would work all right." Apparently he knew what he was talking about. Can you wonder that I ask "Is printing a skill or a mystery"?

While we are on these mysterious happenings, all of you who are familiar with discharge work have seen several machines printing successfully on white discharges, and one or two machines having trouble with the white sticking in and coating the surface of the roller, yet all the white originally came from one batch. The white from the offending machine can be taken away and put into another machine, and apparently work successfully. No printer has ever been able to give the answer to that, other than to blame the Color Shop. Yet, if the Color Shop is making up the paste for the machines which are running perfectly, it is difficult to lay the blame on the Color Shop.

Why should all these mysteries persist in an industry as old as ours? Certainly we have our share of brains, both in management and in the operators themselves. Every one concerned has been trying to run these mysteries down for a great many years, a good deal of technical skill has been applied, and yet these things continue to happen. What answer can we give?

The first answer could be that our industry lacks standardization, possibly more so than any other industry. You men who have attended these various conventions, and who use an electric razor, have had no difficulty in plugging your razor into the outlets here in Augusta, you had no difficulty in Chicago, nor in Boston. The electrical industry is an outstanding example of a high degree of standardization.

The printing industry seems to be further away from any measure of standardization than are related industries of dyeing and bleaching and finishing. In the same plant, different printers have different ideas as to how their machines should be serviced and operated. Take, for instance, the matter of adjusting doctors: some printers like to operate with as little weight as possible, while others will hang anything available onto their doctors. Some printers feel that for certain patterns only brush furnishers can be used, another printer printing the same pattern knows that a brush furnisher cannot be used. Apparently, these differences of opinion among printers cannot be reconciled. Some of the differences in practices from plant to plant are simply amazing. I recall one instance where we had a large run of a certain pattern. This run was so large that we had two sets of rollers engraved. Upon engraving the second set of rollers, we had the engraving made shallower in order to save color. Some time later we had a terrific backlog of work, and asked another plant to print some of our goods for us. We gave them an order calling for this particular pattern. As we had also orders on the same pattern to print at the same time, we gave them the deeper set of rollers and kept the shallow rollers for ourselves. You can imagine our surprise when a couple of days later the manager of the other plant asked if we would give him permission to deepen the set of rollers which we had sent him.

It seems to me that this lack of standardization has been brought about by the strange position the printer finds himself in. The printer has to be a compensating factor for a great many ills which everyone along the line takes a part in. The printer himself can be included in this group. Let's start with the engraving. When the roller first comes to the plant, it is absolutely true across the face and around its circumference. Upon its arrival at the plant it is placed in the lathe and polished. You have all seen a copper roller being polished by means of a hand stone. I am sure that in no other industry would such a procedure be allowed. Certainly in the machine industry, they would know at the beginning that if polishing were done by hand the results would be uneven, but our engraving industry cannot believe that machine polishing would produce satisfactory results. Machine polishing has been carried out in Europe, and in some plants in this country attempts have been made to make copper roll polishing machines. I have actually seen one in operation, and to the best of my knowledge it works perfectly. However, even when rollers have been machine polished they have to be hand-polished afterwards in order to put the proper touch on them. While the hand-polisher lays his stone on the roller and runs the stone back and forth, possibly at the same time he is thinking about last night's activities, or eyeing over some pretty pantograph operator and, of course, it is quite possible that he may have to stay in one spot a little longer while he takes a deep breath, or gasps in admiration at the "new look" the pantograph operator is showing for that day. No one would expect the roller to be absolutely true. Well we take the roller, which is not too true, and place it in the printing machine. Where the polisher has made an unusually long stay in one spot, he has made a low place in the roller. This must be compensated for by the printer, and the only way he can do this is to use a high gauge doctor and put on all the weight he can so that the blade will hug the roller across the surface. Actually the job might ordinarily have required a heavy doctor and light weight. Now the printer himself does his share of hand work and helps to make it a lot more difficult. First of all, he tries to dress the doctor by hand which in many cases might be better if left exactly as it came from the doctor grinding machine. However, many print works prefer not to use the doctor grinder. If the printer does happen to get his doctor out of true, he will find something to compensate for this. So now we have a roller which is made out of true by a little fancy handwork; we have a doctor blade which was dressed by hand, and only a miracle man could dress it absolutely true; and we are possibly going to print a pattern with less than 1/1000" clearance on all sides. This is precision work, but what kind of a machine do we print it in? What kind of tolerances have we? Actually some of the earliest printing machines used in this country are still in existence and working today. With the exception of about two new principle printing machines, I don't believe there is any printing machine in this country on which the tolerance could be figured in a delicate fraction, but even if the machines were made absolutely precise, and the machine builders today are willing and capable of doing that, what would be the point? We start with the printing machine cylinder, which has a slight crown in the center to compensate for bending of the roll when the set is put on. In order to carry out this idea a little further, the printer puts on a few center packs to build the center up still more, then he wraps around this several yards of lapping according to the taste of the individual printer, or boss printer, and over all this he places the blanket. If a heavy fabric is to be printed, and it is necessary to push the pattern through to the back of the cloth being printed, a heavy pressure set is required—so a heavy set is applied so that a measurable bend in the copper roller and mandrel is formed. This is compensated for by the center pack and a slight crown. However, the next time the print machine is used, a light engraving may be required and as a result very little set is needed. Now two alternatives present themselves: should the lapping be unwound and the center pack removed, or should set be applied greater than required? Here again the printer has to become a compensating factor.

A machine starts off with brand new lappings. Lappings are made of worsted and linen, and when new are very spongy.

If in the course of time the lappings do not require to be changed for some time, they may last a very long period. By the time the lappings come off, instead of being soft and spongy, the pressure has reduced them almost to the hardness of stone, and like stone under pressure they come apart in dust particles. So the printer again has to be compensating for the difference in resiliency of his lappings from the day the lapping is installed until the day it is removed.

Let us consider the backgreys. They are just another factor which come in to the application of printing. We have all learned more about how critical the use of backgreys can become since we tried to get along without them during the days of shortages. It was always considered that a backgrey's prime object was to keep the blanket clean, and the second use was to add resiliency to the printing surface. When backgreys were discarded and goods printed on wash blankets, it soon became apparent that the added resiliency and absorbency provided by the backgrey were very important factors indeed. Without a backgrey, a pattern would often be in fit near the edges and out of fit near the center, or vice versa. Fine lines would swell out of all proportion. Changes in depth to prevent flushing would sometimes develop in a poor mark. The final result is that the printer finds himself between the devil and the deep sea in trying to compensate for this lack of grey. Anyone who stays around the print machine long enough has seen patterns which were in perfect fit when using a backgrey, and when a new backgrey was put up the pattern would jump out of fit. It has also been noted that some backgreys give greater color value than others. It would not be possible to have the same condition in backgreys all the time unless the backgrey was just used once. As the backgrey wears down, it becomes full of gum, is ever changing in its resiliency and gives changing results.

This constant task of compensating, which the printer is called upon to do, results sometimes in a habit of over-compensating, and the printer gets to the point where he feels he is not earning his money unless he is constantly making some kind of a change.

Another problem which presents itself to the printer, and which sometimes has an apparently mysterious effect, is caused by the differences in rate of paste consumption. For instance, in a very fine shallow engraving the paste is in the box for a long period of time, and is being whipped around by the rotation of the roller. A similar paste in another machine with deep engraving and plenty of coverage is being consumed at a high rate of speed, and is not getting the same churning around the same length of time. This difference can become very marked, particularly in the case of pigment white and of emulsion type pastes; and we have noted that a pigment white which would not run in one machine, and can be run easily in another, is often suffering from too much churning due to a low rate of color consumption.

The methods which different printers use in compensating for these various difficulties differ in various print shops, and with printers in the same shop. Thus the printer becoming highly individualistic, contributes to making standardization very remote.

Now let's go back and have another look at the engraver. Actually the engraver has a better chance for producing uniform results than has the printer. He has less problems and less variables to cope with, but apparently he likes to do things the hard way and enjoys a few mysteries of his own. If you were to send five similar patterns to five different engravers and specify the number of lines per inch required and whether the engraving shall be up to the surface or not, and what type of outlines will be required, you will get five different depths of engraving. If you do your own engraving in your own plant you will probably end up with the same results. After all, most engraving is purely a mechanical job and is carried out in all kinds of industries where little tolerances are allowed. Etching of rolls is a very important job, but usually there is more guess work employed than anything else. The etcher puts the roller in the etching bath and gives it several turns, and then takes a peek through a glass. This is continued until he feels that the job is complete. Then, just for good luck, he tells his helper to give it four or five more turns. Actually, there are engraving shops in this country which have never even heard of a depth gauge. To the best of my knowledge, very little attention has been given to see that the engraving is uniformly near the surface. Should the etching be carried out too far, the teeth of the engraving are unduly sharp and will suffer from pressure on the doctor. This is bound to add to the printer's woes.

Having looked the many mysteries in the face, and analyzed the causes of most of them, what can we do to prevent their constant recurrence? First of all, we can start at the beginning with machine polishing copper rollers. If we stopped trying to work up a copper roller by hand, we might have made one good step in the right direction. Secondly, we could steal a page from the European book in having a standard size copper and building up the copper after it has been turned off. This would minimize quite a few of our troubles and would save time for the engraver and the printer alike. A thorough study of engraving should be made, particularly in regard to etching. As we pointed out before, over-etching can bring trouble to the printer later on. There is no doubt that there must be an ideal depth for every ground used. If this were worked out, then the constant use of the depth gauge would be a great help. The use of the doctor grinder and the possible use of some equipment for dressing the doctor should also help. Now on the print machine itself there is no doubt that much could be done to improve the tolerances in the machine. Some plants have already equipped their machines with roller bearings for their mandrels. The print machine itself should be properly lined up. In order to overcome the changes in resiliency of lapping, it might be well to consider something along the line of a permanent resilient base. Rubber has been used, and there is no doubt that rubber could be used successfully if too much set were not applied against it. Where heavy set is used, the rubber is liable to be pushed forward, and in addition to that there is also a danger of wearing the edges. This latter fault is very marked when a heavy set is applied against a rubber covered cylinder. However, it is possible that something more durable than rubber could be used; one of the synthetic rubbers, or some other synthetic resinous material. If we go into permanent covering for printing cylinders, then it would be impossible to use a machine first for light set and then for heavy set and expect to be able to change the packing. Also, there would have to be less changing of width in the printing machine. Standardization would have to take place by confining machines to certain goods and types of patterns. For instance, in a printing plant operating twenty machines it might be better to operate ten machines twice the number of hours and thus have machines available for all types of work. The use of the continuous wash blanket would seem like a step towards standardization, inasmuch as it gets rid of the backgreys which are also ever changing in their resiliency and condition. While at the present time wash blankets in use without backgreys have not proved too successful, yet it is everyone's hope that they will become more and more successful when different types of blankets are tried, and changes made to find an ideal blanket. If a continuous wash blanket of the right type is not possible, then the nearest thing to help this condition would be the continuous wash backgrey now in use in many plants, which appears to give very good satisfaction.

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Printing Group Meeting—

REQUIREMENTS OF PETROLEUM SOLVENTS IN PIGMENTED TEXTILE PRINTING PASTES*

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WHILE a considerable volume of petroleum solvent is consumed as a thinner for the concentrates used in printing with pigmented pastes, there apparently have been no extensive studies made concerning the effect of solvent composition on the performance characteristics of these types of formulations. In preparing the emulsions from commercially-available concentrates, certain general characteristics of the solvent were known to be important, but the fundamental effect of the relative concentrations of the three hydrocarbon classes found in these petroleum solvents, paraffin, naphthene and aromatic, was not critically examined. The choice of the currently favored solvents may well have been based on results of a trial and error method with final standardization on products which gave a satisfactory performance. It is not the purpose of this paper to criticize this approach, but rather to point out significant trends in performance characteristics resulting from controlled changes in the composition of the hydrocarbon solvent. That is to say, the object of this study is to point out in a more fundamental way what is necessary with respect to composition, and therefore to a certain extent physical properties, of the solvent for optimum performance of the pigmented emulsions.

The advice and active cooperation of the two principal suppliers of the concentrates, Sherwin-Williams Company and the Aridye Division of Interchemical Corporation, was enlisted for this study. Much of the actual test work was carried on in their respective Laboratories.

Materials

A petroleum naphtha, Sovasol No. 5, commercially available from the Socony-Vacuum Oil Company, meeting the ASTM specification for a Mineral Spirits *(1)* was completely dearomatized by treating with fuming sulfuric acid to yield a base stock from which all of the experimental thinners were prepared. A Specific Dispersion value of 98.4 as well as ASTM test D 875-46T *(2)* indicated the aromatic content to be nil. A value of 0.18 for the Bromine Number also carried out according to ASTM test D 875-46T *(2)* showed the olefinic content to be essentially zero. Using the method of Refractivity Intercept as proposed by Ward and Kurtz *(3)* a paraffinic content of 51 percent and a naphthenic content of 49 percent was calculated. Other physical properties of this dearomatized material are shown in Table I where it is represented as Blend No. 11. Blend No. 23 is the same product before dearomatization.

The aromatic base stock used to prepare the various blends containing aromatic material was a sulfur dioxide extract of a petroleum product and had a boiling range of 300°-340° F. The aromatic content measured about 99 percent.

The paraffinic base stock was prepared by acid treating the 300°-400° F. boiling-range product derived from higher boiling fraction of petroleum alkylate. This is the product resulting from the acid catalyzed reaction of olefins, usually butenes, and isoparaffins, usually isobutane. This reaction does not lead to the formation of cyclic hydrocarbons.

Cyclohexane obtained from Eastman Kodak Company used without further purification constituted the naphthenic base stock.

Table I summarizes the composition and properties of all of the thinners used in this study. Blend Nos. 12, 13 and 14 were prepared by adding the calculated volume of the aromatic stock to Blend No. 11, the dearomatized base stock having a paraffin/naphthene ratio of about 1:1. The calculated volume of paraffinic base stock was added to the dearomatized naphtha (Blend No. 11) to prepare the stock having the 2:1 paraffin/naphthene

* Presented at Textile Printing Group Meeting, Augusta National Convention, October 22, 1948.

TABLE I
PHYSICAL PROPERTIES OF EXPERIMENTAL THINNERS

Blend No.	*11*	*12*	*13*	*14*	*15*	*16*	*17*	*18*	*19*	*20*	*22*	*23*	*	**
Gravity, °API	52.5	49.8	47.6	45.2	53.0	50.7	48.2	45.9	51.8	49.6	45.0	48.3	48.7	46.9
Sp. Gravity, 60/60°F.	0.769	0.780	0.790	0.801	0.767	0.777	0.787	0.798	0.772	0.781	0.802	0.787	0.785	0.793
ASTM Distillation, °F.														
I.B.P.	314	304	304	306	307	307	306	296	194	197	206	304	306	296
10%	326	318	316	316	320	318	317	316	222	230	247	318	316	310
50%	340	334	328	328	336	334	331	331	326	325	325	336	330	332
90%	364	358	356	352	361	360	357	356	357	355	349	362	350	370
F.B.P.	394	390	384	384	393	392	386	383	386	382	381	392	384	406
Mixed Aniline Point (ASTM D 611)	155.5	145.0	138.2	129.6	156.6	150.1	140.4	131.4	146.1	138.9	122.7	140.2	141.1	135.7
Aniline Point, °F.	157.6	137.8	121.6	103.7	160.2	145.4	127.8	109.8	138.6	123.4	....	125.8	129.0	117.7
Kauri Butanol No.	28.9	37.9	41.3	45.6	30.9	35.0	37.5	44.9	37.3	40.2	50.8	36.7	38.2	39.5
Refractive Index	1.425	1.434	1.440	1.447	1.425	1.432	1.439	1.446	1.425	1.432	1.447	1.438	1.437	1.443
Specific Dispersion	98.4	99.1	113.7	121.0	98.0	103.9	115.3	122.6	99.2	106.9	125.3	111.9	112.0	119.3
Composition, Vol., %														
Paraffins	51	46	41	36	63	57	50	44	37	34	27	42.5	43.5	39.0
Naphthenes	49	44	39	34	37	33	30	26	63	56	43	41.0	41.0	40.7
Aromatics	0	10	20	30	0	10	20	30	0	10	30	16.5	15.5	20.3

* Sherdye control thinner
** Aridye control thinner

ratio (Blend Nos. 15, 16, 17 and 18), and cyclohexane to prepare the material of 1:2 paraffin/naphthene ratio (Blend Nos. 19, 20 and 22). As in the first series, aromatic stock was added to portions of these latter two materials to give the desired aromatic content.

Composition and physical properties of the two naphthas used for control are also shown in Table I.

The unpigmented resin concentrates are commercially available products. Sherwin-Williams products bore the designation SDO-1033, and Aridye's, Clear 6214-8. The color concentrates are also commercially available products.

Procedure

SHERDYE CONCENTRATES. — The procedure involved the preparation of a basic emulsion by first cutting the resin concentrate (30 parts) with the naphtha thinner (250 parts), noting the dispersion, and then adding the water (720 parts) slowly with high speed mixing. After adding the color cut to this emulsion, which is more commonly known as an "extender", the mixture was ready for use in the printing machine.

A "squeeze test" was applied to a portion of each extender to measure its stability. This test while simple yields results which can be correlated with results which are observed in actual mill practice. It consists of squeezing by hand about 50 grams of extender through a 12 inch by 12 inch piece of 80-square percale until the emulsion breaks completely. The greater the number of times the extender can be squeezed through the cloth without breaking the emulsion, the greater is its stability.

The dispersion of the concentrate in the thinner was considered satisfactory if none of the resin came out of solution as a curdy precipitate. The appearance of the emulsion, that is, whether it was grainy or smooth, and the body of the emulsion were measured by visual observation only.

Test prints were made on a small, hand-operated printing machine in two reductions, 1:19 and 1:49 color cut to extender, using a blue colored pigment. Greater and more consistent variations in depth of color were observed in the 1:19 reduction as the result of varying the thinner, and conclusions were therefore based principally on prints made at this reduction.

Although definite variations in strength or color value could be observed by visual examination of the test prints, it is difficult to accurately describe and classify these small variations clearly and correctly. It was found, however, that the degree of reflectance of the various prints when measured by the Hunter Multipurpose Reflectometer was significantly different, one from the other, and in general agreement with visual observation. That is to say, those prints which appeared to have the greatest depth of color showed significantly less reflectance than those which displayed poor color strength.

TABLE II
EXPERIMENTAL SOLVENT BLENDS IN SHERDYE EXTENDERS

	Paraffin/Naphthene 1/1					*Paraffin/Naphthene 2/1*				*Paraffin/Naphthene 1/2*		
Blend No.	11	12	23	13	14	15	16	17	18	19	20	22
Aromatics, %	0	10	16.5	20	30	0	10	20	30	0	10	30
Dispersion	OK	OK	OK	OK	OK	Curdy	OK	OK	OK	OK	OK	OK
Emulsion	OK	OK	OK	OK	OK	Slightly Grainy	Slightly Grainy	Very Slightly Grainy	OK	OK	OK	OK

ARIDYE CONCENTRATES.—The procedure followed for these materials was essentially the same as was used to evaluate the thinner in the Sherdye products. The "squeeze test", however, was not used as a measure of stability. This property was determined by visual examination for evidence of deemulsification as evidenced by graininess, and change in body. Observations were made at the time the emulsions were prepared and again after standing 24 and 48 hours.

Test prints were not prepared with all of the formulations but only with those which showed stability equivalent or superior to a formulation prepared with Aridye's control thinner. These test prints were evaluated by visual inspection only.

Results and Discussion

EFFECT OF THINNER COMPOSITION ON EMULSION STABILITY OF SHERDYE CONCENTRATES. — The characteristics of the emulsions incorporating the various experimental thinners are summarized in Table II. Dispersion refers to the appearance of the solution of the unpigmented resin concentrate in the thinner before stirring in the water. All of the experimental blends satisfactorily dispersed the resin except Blend No .15 which resulted in the formation of a curdy precipitate. This blend had the lowest solvent power of the thinners investigation, its composition being predominantly paraffinic and entirely lacking in aromatics.

High concentrations of paraffins also result in grainy emulsions as indicated by Blends 15, 16 and 17. It will be noted that with a paraffin/naphthene ratio of 2:1 it is necessary to go to an aromatic-concentration greater than 20% to obtain an emulsion free of graininess while thinners having paraffin/naphthene ratios of 1:1 or lower do not require any aromatics to produce smooth emulsions.

While the thinner requirements are not especially stringent in obtaining a good dispersion and emulsion in an extender, they become increasingly so in obtaining the maximum body. The effect of thinner composition on the body of the emulsion is shown in Figure 1. It is noteworthy that too high as well as too low a solvency, or aromatic content, results in a thin emulsion. It also appears that the optimum aromatic content decreases with decreasing paraffin/naphthene ratios. At a 1:1 ratio the optimum is at about 16-19% aromatics slightly higher at a 2:1 ratio and apparently somewhat lower at a 1:2 ratio. The last point is not conclusive from the data available.

As is shown in Figure 2 the stability of the extender is directly related to the solvent power of the thinner. It will be noted that for the three paraffin/naphthene ratios studied, stability as measured by the squeeze test increases with increasing aromaticity. It has been found that an extender with a stability sufficiently high to be considered satisfactory on the basis of performance in actual mill operation will not break when undergoing the Squeeze Test until it has passed through the percale a minimum of about six or seven times. The data indicate that all of the experimental thinners of very low solvent power can be eliminated from serious consideration as having commercial possibilities since extenders prepared with them fail to exhibit that minimum degree of stability which is considered essential for satisfactory printing. And, as will be pointed out below, since there appears to be a dropping off of color strength in prints made with extenders of low body as a result of too high an aromatic concentration, apparently the thinners of intermediate solvency, such as exhibited by most conventional mineral spirits, are most promising when all points are considered. Such thinners produce good dispersion, a non-grainy emulsion, good stability and about a maximum body. As will also be discussed below, thinners of intermediate solvency having a 1:1 paarffin/naphthene ratio are to be preferred over either higher or

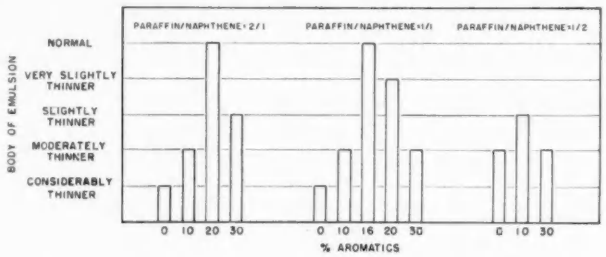

Figure 1. Effect of Thinner Composition on Body of Emulsion.

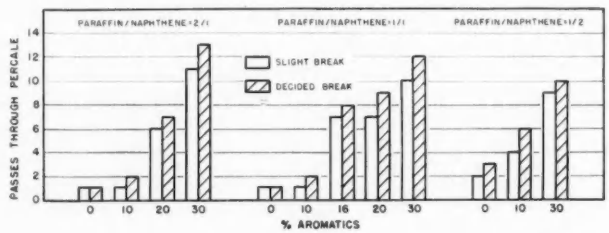

Figure 2. Effect of Thinner Composition on Stability of Emulsion.

lower ratios since they show a maximum color strength.

EFFECT OF THINNER COMPOSITION ON EMULSION CHARACTERISTICS OF ARIDYE CONCENTRATES.—Experience over an extended time period with the Aridye Clears demonstrated that the stability of the emulsion prepared with these products is directly reflected in the degree, or lack of, graininess and the constancy of the body upon standing up to 48 hours. These observations were made on the emulsions prepared with the various thinners and the relative stability determined by comparison with the observations made on the emulsion containing the control thinner. The control thinner gave satisfactory mill performance.

On the basis of these tests emulsions containing Blends 14, 17, 18 and 22 were found to have a stability equivalent to, or greater than, the control. These findings are in good agreement with findings discussed above for the Sherdye concentrates where it was shown that all of the above four blends and in addition Blends 13 and 23 exhibited satisfactory stability. The differences in these results may or may not be significant since the lower stability noted in the case of Blend No. 23 with the Aridye Clear was only very slight and it has not yet been demonstrated that minute differences in stability detected in these laboratory tests are reflected in performance in actual mill operation.

It will be noted in the composition of the Blends which showed good emulsion stability with the Aridye Clears that each of the three paraffin/naphthene ratio groups are represented and each at the high aromatic content. This confirms the findings with the Sherdye concentrates that the stability is directly proportional to the solvent power of the thinner.

Although complete results are not available on the effect of thinner composition on the body of the emulsion with Aridye Clears, it can perhaps be inferred that about the same correlation would hold as was found with the Sherdye extenders, this inference being based on the satisfactory agreement between th two products on the effect of thinner composition on stability. Sherdye concentrates showed maximum body with thinners of intermediate solvency such as displayed by a conventional mineral spirits. Both high and low solvencies resulted in excessive thinning of the emulsion.

EFFECT OF THINNER COMPOSITION ON PRINTING CHARACTERISTICS OF SHERDYE CONCENTRATES.—The reflectance as measured by the Hunter Reflectometer was used to obtain a numerical measurement of the color value of the test prints. It was found that those prints which exhibited the greatest depth of shade when visually examined showed the least reflectance due probably to a greater absorbing power. In Figure 3 are plotted the reflectance values of those prints made at a reduction of 1:19 (color cut to extended) against the aromatic content of the thinner. The points of equivalent paraffin/naphthene ratios are joined by smooth curves. The curves are drawn somewhat arbitrarily especially for the series 1:2 and 2:1 paraffin/naphthene ratio because of the relatively few points for these series. (An additional point at 0% aromatics for the 2:1 ratio is not shown due to lack of space, but it falls exactly on the straight line joining the points at 10% and 20% aromaticity.) However, the data in no way indicate that the curves do not follow the path as drawn and it is to be expected that they should follow the general shape of the curve of the 1:1 paraffin/naphthene ratio for which there is ample evidence to draw as indicated. There is some evidence also that a point of minimum reflectance does exist for each paraffin/naphthene ratio.

The point of minimum reflectance, that is, maximum color value, is not at the same aromatic content for the different paraffin/naphthene ratios but rather occurs at a point of decreasingly less aromaticity as the naphthenic content is increased. A rather unexpected development is that the same minimum reflectance for the various paraffin/naphthene ratios cannot be attained by proper adjustment of the aromatic content. The data indicate that the optimum ratio is 1:1, both higher and lower ratios resulting in a higher point of minimum reflectance. The data further indicate that formulations containing thinners having a 1:1 paraffin/naphthene ratio consistently produce strong prints and are not as sensitive to changes in aromaticity as the other groups studied.

The point of minimum reflectance for the paraffin/naphthene ratio of 1:2 occurs at about 13% aromatics, for the 2:1 ratio at about 22% and for the intermediate ratio of 1:1 at an aromatic content midway between these values, that is, at about 17-18%. It would appear that there exists a direct relation between the body of the extender and the strength of the print since maximum body occurs at about the same point as does maximum strength. Loss of body as a result of too high a thinner solvency results in excessive penetration

(Continued on Page P759)

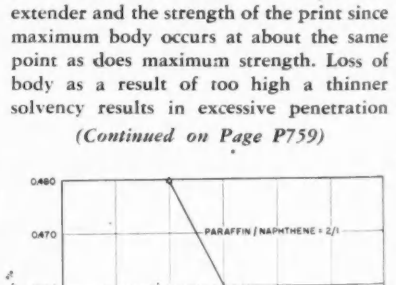

Figure 3. Effect of Thinner Composition on Reflectance of Textile Prints

Testing and Auxiliaries Group Meeting—

AN EVALUATION OF SOAPS AND SYNTHETIC DETERGENTS*

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THE performance of soaps and synthetic detergents in the home laundering of fabrics is of specific interest to both the manufacturer and the user of textile materials. Not only should the laundered fabric be clean but it should retain as much as possible of its original color, firmness, and strength. Good results in laundering depend largely on the selection of the proper detergent and its correct use in relation to the fabric and the type of soil to be removed. The Bureau of Human Nutrition and Home Economics is attempting to obtain information along these lines that will enable homemakers to determine the optimum conditions for home laundering of clothing and household fabrics.

In the laboratory study reported here the Bureau has evaluated soaps and synthetic detergents by measuring the change in light reflectance which they produced on artificially soiled cotton fabric laundered under standardized conditions. Samples of the test fabric were laundered in distilled and hard water at both 60° and 40°C. using varying concentrations of detergents. Future work will include similar investigations in laundering cotton, woolen, and rayon fabrics for various times, speeds of agitation, and with the addition of detergent aids. Also the effects of repeated laundering on the chemical and physical properties of fabrics will be investigated.

A survey of the literature on laundering disclosed that numerous methods have been used to evaluate detergents. Some measure such properties as surface tension, wetting ability, foaming power, and the capacity for holding soil in suspension *(1, 2)*[2]. However, the actual washing of an artificially soiled fabric in a solution of the detergent under standardized conditions seems to be more satisfactory for estimating the soil-removing efficiency of a detergent. Determinations of the amount of soil removed have been made by measuring the mechanical force required to remove soil from the cloth *(3)*, and by measuring the light absorption of the detergent solution *(2)* or the light reflectance of the test fabric before and after laundering. Much work along the latter line appears in the literature.

Various investigators have stressed different aspects of the problem. A few *(4, 5, 6)* have studied types of soil; some *(7, 8, 9)* have devised special machines for applying the soil; others *(10, 11)* discussed simplified equipment including photometers which can be made in the laboratory; Woodhead et al *(12)* studied the reproducibility obtained by different methods of washing the soiled fabric; and Crowe *(13)* reported the reproducibility that could be obtained when a standardized procedure was used by different technicians.

Several workers have used the same general type of procedure to compare the washing efficiencies of different detergents under varying conditions. However, no two have used exactly the same procedures and results cannot be compared. Many of them *(11, 14, 15, 16, 17, 18, 19)* used soap alone or with alkaline builders. Harris and associates *(20, 21, 22)* used various products in combination with builders in hard and sea water; Clark and Holland *(6)* and Sylvester and co-workers *(23)* used soap and different types of synthetic detergents; and Flett *(24, 25)* and Bacon *(26)* compared a few synthetic detergents with soap in both hard and soft water. No comprehensive comparison of the many classes of soaps and synthetic detergents now on the market has been made under conditions similar to those used in home laundry practice.

Experimental Procedure

CLASSIFICATION AND ANALYSIS OF THE DETERGENTS.—The detergents (27) selected for this study include both soaps and synthetic detergents representing the various classes now commercially available. The soaps (Table I) have been divided into three general groups depending on the amount of builder present: soaps with little or no builder, built soaps, and soap powders which are composed principally of alkaline builders. Soap 1, a commercial chip soap, was chosen as the standard with which to compare the washing efficiency of the other detergents. Soaps 4 and 5 and potassium oleate were obtained from a chemical supply company. Soaps that were purchased on the retail market under various trade names are indicated by the letter "r" following the identifying number. Soap powder 1 was a commercial product recommended especially for dishwashing.

The synthetic detergents (Table II) have been classified according to their manner of ionization in aqueous solution. These classes are (1) anionic detergents[3] in which the active part of the molecule has a negative charge, (2) cationic detergents in which the active part of the molecule has a positive charge, and (3) non-ionic detergents which are electrically neutral in solution.

The anionic synthetic detergents have been subdivided into four groups according to the type of active ingredient which they contain: (a) salts of alkyl sulfates, (b) sodium salts of alkyl aryl sulfonates, (c) sodium salts of sulfated and sulfonated esters, and (d) sodium salts of sulfated and sulfonated amines or amides. The alkyl aryl sulfonates are of particular interest since the long chain alkyl group is derived from petroleum rather than natural fats and oils. The cationic products selected have quaternary com-

* Presented at Testing and Auxiliaries Group Meeting, Augusta National Convention, October 22, 1948.

[1] Grateful acknowledgment is given to Elma Baxter and Phyllis Putman for assisting with washing tests and calculating results.

[2] Figures in parentheses refer to literature cited at the end of this article.

[3] Soaps also are anionic.

TABLE I. Composition of soaps

Soap	Description	Active ingredient (Anhydrous soap)	Moisture	Insoluble filler	Total salts[1]	Alkaline salts (as Na_2O)	Sodium chloride	Phosphate (as P_2O_5)	Free alkali (as NaOH)	pH of 1% aqueous solution	Titer of mixed fatty acids
		Percent	Percent	Percent	Percent	Percent	Percent	Percent	Percent		°C.
Soaps without builder[2]											
Soap 1	Flake	92.5	2.3	2.0	3.2	1.6	0.4	0	0	9.9	40.9
Soap 2r	Flake	96.4	0.9	0.3	2.4	0	0.9	0	0	10.1	37.2
Soap 3r	Flake	96.2	0.9	0.3	2.3	0	0.2	0	0.3	10.1	40.7
Soap 4	Powder	95.5	3.0	0	1.5	0.1	0.5	0	0	10.2	40.8
Soap 5	Powder	95.1	2.9	0	2.0	0.1	0.2	0	0	10.1	40.6
Soap 6r	Flake	93.2	1.7	0.2	4.9	0.1	0.7	0	0	10.1	37.3
Potassium oleate	Powder	79.8	19.4	0	0.5	0.1	0.1	0	0.3	10.6	12.2
Built soaps[3]											
Built soap 1r	Powder	77.8	2.7	4.2	15.3	2.0	8.8	0	0	9.8	42.2
Built soap 2r	Powder	74.6	1.1	0.1	24.1	4.2	5.9	9.7	0.1	9.9	39.2
Built soap 3r	Powder	72.3	3.4	12.0	11.8	5.9	0.6	2.4	0.5	9.8	38.4
Built soap 4[4]	Bar	72.0	20.3	0	7.3	0.2	0	0	0.4	9.7	38.4
Built soap 5r	Yellow Bar	68.4	12.2	7.7	11.5	3.1	0.2	0	0.2	10.3	40.4
Built soap 6r	Powder	58.5	4.2	12.3	25.0	6.0	12.8	2.2	0	9.8	38.6
Built soap 7r	Powder	57.3	5.0	12.1	25.6	7.2	1.3	4.6	0	10.0	29.2
Built soap 8r	Powder	54.8	6.0	7.7	31.5	8.4	13.6	2.9	0	9.7	37.8
Soap powder[5]											
Soap powder 1	Powder	6.8	6.0	0.2	86.9	30.7	1.8	24.5	0.1	10.1	...

[1] Total salts = 100 — (anhydrous soap + water + insoluble filler + free alkali).
This value for total salts includes alkaline, acid, and neutral salts; also water-soluble filer.

[2] Soap with less than 5 percent builder.

[3] Built soap containing a mixture of soap and one or more builders with not less than 50 percent of anhydrous soap (27).

[4] This soap was prepared in the Bureau's laboratory from clarified waste kitchen fat, lye, and borax.

[5] Soap powder containing a mixture of soap and one or more alkaline detergents, but composed principally of the latter (27).

TABLE II. Composition of synthetic detergents

Synthetic Detergent	Description	Active ingredient	Soap and fatty matter	Matter volatile at 105° C.	Matter insoluble in water	Alkaline salts (as Na_2CO_3)	Neutral salts	Sulfate[1]	Chloride[1]	Phosphate (as P_2O_5)	pH of 1% aqueous solution
		Percent	Percent	Percent	Percent	Percent	Percent			Percent	
Anionic Detergents:											
Salts of alkyl sulfates											
Sodium lauryl sulfate 1	Powder	48.6	1.4	1.8	0	0	48.2	+	trace	0	9.5
Sodium lauryl sulfate 2	Powder	46.5	1.5	3.3	0.1	0.5	48.1	+	trace	0	7.3
Sodium lauryl sulate 3r	Powder	38.2	0.7	4.1	0	0.4	56.6	+	trace	0	7.5
Sodium lauryl sulfate 4	Paste	31.5	1.1	63.0	0	0	4.4	+	trace	0	8.5[2]
Sodium lauryl sulfate 5r	Powder	18.7	0.8	4.3	0.1	17.6	58.0	—	trace	29.1	10.0
Sodium oleyl sulfate 1	Liquid	27.2	1.1	67.9	0	0.2	3.6	+	trace	0	9.9
Triethanolamine lauryl sulfate 1r	Liquid	18.8	0.7	77.0	0	0	3.5	+	trace	0	6.0
Sodium salts of alkyl aryl sulfonates											
Alkyl aryl sulfonate 1	Powder	90.8	5.7	1.4	0	0.1	2.0	trace	trace	0	7.7
Alkyl aryl sulfonate 2	Powder	89.4	6.7	2.1	0	0	1.8	trace	+	0	8.8
Alkyl aryl sulfonate 3	Powder	36.4	2.9	2.4	0	0.4	57.9	+	trace	0	6.8
Alkyl aryl sulfonate 4	Powder	36.2	0.8	2.3	0.1	0	60.6	+	trace	0	7.4
Alkyl aryl sulfonate 5r	Powder	31.6	2.4	1.1	0.2	0	64.7	+	trace	0	6.5
Sodium salts of sulfated and sulfonated esters											
Sulfated glyceryl ester 1r	Powder	29.6	2.4	1.1	0	1.7	65.2	+	trace	4.6	6.5
Sulfated glyceryl ester 2	Powder	26.7	5.6	0.5	0.1	1.1	66.0	+	+	4.6	6.2
Sulfonated ethyl ester 1	Powder	50.0	2.1	1.2	0.5	0	46.2	+	+	0.6	6.5
Sodium salts of sulfated and sulfonated amines or amides											
Alkyl amine sulfate 1	Powder	12.8	1.7	16.3	0	23.0	46.2	+	+	0	8.1
Alkyl amine sulfate 2	Powder	11.5	1.7	27.5	0	38.9	20.4	+	trace	0	8.4
Fatty acid amide sulfate 1	Powder	18.6	7.6	2.5	0.4	0	70.9	+	—	0	8.3
Fatty acid amide sulfate 2	Powder	8.9	1.7	2.1	0.1	4.6	82.6	+	—	0	8.2
Fatty acid amide sulfonate 1	Powder	31.9	3.4	0.9	0.6	0.3	62.9	—	+	0	7.3
Fatty acid amide sulfonate 2r	Powder	30.4	1.4	0.8	0	0.2	67.2	+	—	0	8.2
Fatty acid amide sulfonate 3	Powder	15.3	2.3	0.7	0.1	0	81.6	+	+	0	7.0
Cationic Detergents:											
Cetyl trimethyl ammonium bromide	Powder	98.8	1.0	0.2	0	0	0	—	—	0	5.6[2]
Alkyl dimethyl benzyl ammonium chloride	Liquid	21.8	1.0	72.8	0	0	4.4	—	+	0	5.0[2]
Diethyl aminoethyl oleyl amide dimethyl sulfate	Liquid	8.3	1.3	90.4	0	0	0	—	—	0	4.0
Non-ionic Detergents											
Fatty acid amides											
Fatty acid diethanolamide 1	Liquid	87.6	[4]	11.3[3]	0	0	1.1	—	+	0	9.6
Fatty acid diethanolamide 2	Liquid	87.5	[4]	11.4[3]	0	0	1.1	—	+	0	9.5
Fatty acid diethanolamide 3	Liquid	78.9	[4]	19.7[3]	0	0	1.4	—	+	0	9.6
Polyethylene ether condensates											
Polyglycyl ester 1	Liquid	98.3	[4]	1.7	0	0	0	—	—	0	8.0
Polyglycyl ester 2r	Powder	14.1	2.8	5.0	0.6	17.7	59.8	—	—	27.8	9.7
Polyglycyl ester 3r	Powder	13.1	6.7[4]	1.9	35.7[5]	15.2	27.4	—	trace	21.9	9.8
Polyglycyl ester 4r	Powder	12.5	7.8[4]	2.2	34.5[5]	15.4	27.6	—	—	21.9	9.9
Polyglycyl ester 5	Powder	11.3	9.3[4]	2.1	36.2[5]	16.1	25.0	—	—	21.9	9.8
Polyglycyl ether 1	Liquid	27.6	6.0[4]	66.3	0	0	0.1	trace	—	0	7.7
Polyglycyl ether 2	Liquid	27.4	6.2[4]	66.4	0	0	0	—	—	0	7.3

[1] Qualitative test: the plus sign indicates salt is present; the minus sign indicates salt is absent.

[2] pH is variable.

[3] Dried 2 hours; detergent is volatile.

[4] Determination of soap plus fatty matter is unreliable due to formation of stable emulsions.

[5] Qualitative test indicated starch.

Figure 1. Apparatus for soiling test cloth.

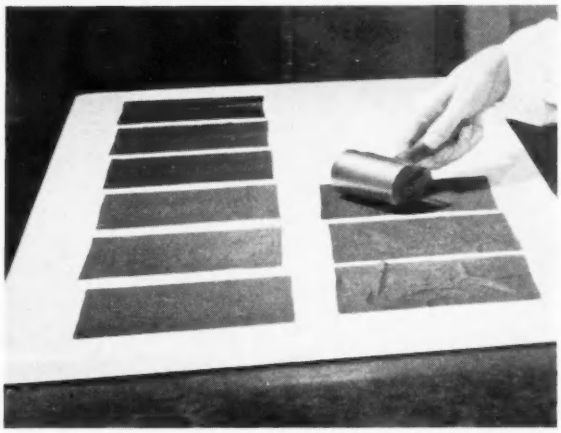

Figure 2. Spreading the wet test samples on a glass plate and pressing them flat with a weighted roller.

pounds as the active ingredient. The nonionic detergents have been divided into fatty acid amides and polyethylene ether condensates. Most of the synthetics were purchased directly from the manufacturing company. Those purchased on the retail market are indicated by the letter "r" following the identifying number.

The soaps and synthetic detergents were analyzed according to the methods adopted by the American Society for Testing Materials *(27, 28)*. No attempt was made to determine the chemical composition of the active ingredient, since such information is available in the literature *(29, 30, 31, 32, 33, 34, 35, 36)*.

PREPARATION OF SOILED TEST CLOTH.—The test fabric used for evaluating the detergents was a bleached percale sheeting having 105 yarns in the warp and 91 in the filling and weighing 3.9 ounces per square yard. A continuous strip (12 inches by 200 inches) of the material was degreased and desized *(37)*, pressed smooth with a warm iron, stored over calcium chloride for at least 12 to 18 hours, and soiled in the soiling apparatus (Figure 1) built especially for this study.

The apparatus consists of a stout wooden frame (6 feet long, 1½ feet wide, and 3 feet high), with six rollers for guiding the cloth, a trough for the soiling mixture, and a power-driven clothes wringer for removing the excess soiling solution. The fabric was kept taut and smooth by means of a tension device and the speed was adjusted to approximately 5 yards per minute. The cloth was given six immersions through a soiling mixture containing 8.0 grams of colloidal graphite (in oil), 6.0 grams of tallow, and 6.0 grams of mineral oil in 4000 ml. of carbon tetrachloride. The fabric was then air dried.

Each strip of soiled fabric was cut into test samples (6¼ inches by 4¾ inches). The samples were aged by heating in an oven at 60° ± 2° C. for one hour, dipped three times in distilled water at approximately 40° C., spread on glass plates (Figure 2) until air dry and stored over calcium chloride at 21° ± 2° C. for at least 12 to 18 hours. In all cases the test fabric was laundered within 10 days after soiling. In practice three strips were soiled during one day and the test samples randomized so that every laundering replicate contained 3 samples, that is one from each of the 3 fabric strips.

PROCEDURE FOR EVALUATING THE DETERGENTS.—The detergents were evaluated for their soil-removing efficiency by measuring the change in light reflectance which they produced on laundering the soiled test fabric. Prior to the washing process the light reflectance of each sample of test fabric[4] was read in five places with a photoelectric reflectometer (Figure 3). Then each sample was

[4] The initial brightness of the soiled test fabric ranged from 20 to 26 percent relative to magnesium oxide.

Figure 3. Measuring the light reflectance of test cloth with a photoelectric reflectometer. A mat of black cardboard containing 5 holes, each the size of the base of the search unit, is placed over the sample and the light reflectance of the 5 areas read; after laundering the light reflectance of the same 5 areas is read again. Each sample as read is backed by two samples of the laundering replicate.

TABLE III. Soil removed from test fabric at different concentrations of detergent, as received, in water of varying hardness at 60° C. and at 40° C.

Temperature of detergent solution: 60° C.

Detergent			Mean spread (and standard deviation) at different concentrations of detergent as received				
Type	Active ingredient	Hardness of water	0.05 Percent	0.15 Percent	0.25 Percent	0.35 Percent	0.50 Percent
	Percent						
Soap 1	92.5	Distilled	6.5 ± 0.9	11.1 ± 0.9	15.7 ± 1.6	—	—
		150 p.p.m.	4.2 ± 0.3	5.4 ± 0.5	11.2 ± 1.9	14.7 ± 0.7	—
		300 p.p.m.	—	5.0 ± 1.2	4.9 ± 0.8	10.1 ± 1.7	15.0 ± 0.8
Soap 2r	96.4	Distilled	6.9 ± 0.7	13.9 ± 1.4	16.6 ± 1.4	—	—
		150 p.p.m.	3.4 ± 0.7	5.7 ± 0.6	14.7 ± 0.9	15.7 ± 1.4	—
		300 p.p.m.	—	4.8 ± 1.0	4.2 ± 0.4	13.1 ± 2.7	14.1 ± 1.3
Built soap 1r	77.8	Distilled	7.2 ± 1.2	13.2 ± 1.5	16.6 ± 1.4	—	—
		150 p.p.m.	3.4 ± 0.3	4.6 ± 0.6	11.7 ± 2.3	15.0 ± 0.5	—
		300 p.p.m.	—	4.6 ± 1.0	4.0 ± 0.6	7.9 ± 2.0	14.5 ± 0.9
Sodium lauryl sulfate 2	46.5	Distilled	4.5 ± 0.3	9.2 ± 0.4	12.3 ± 1.6	—	—
		150 p.p.m.	2.9 ± 0.6	6.2 ± 0.6	9.4 ± 0.9	9.3 ± 1.1	—
		300 p.p.m.	—	8.1 ± 1.0	8.9 ± 1.1	7.6 ± 0.6	7.7 ± 0.8
Alkyl aryl sulfonate 3	36.4	Distilled	3.8 ± 0.3	5.6 ± 0.6	7.1 ± 2.1	—	—
		150 p.p.m.	—	4.0 ± 0.2	5.6 ± 0.3	5.0 ± 0.1	—
		300 p.p.m.	—	3.8 ± 0.7	7.1 ± 0.8	6.5 ± 0.7	7.0 ± 1.9
Sulfated glyceryl ester 2	26.7	Distilled	4.1 ± 0.8	5.5 ± 1.1	6.2 ± 1.4	—	—
		150 p.p.m.	3.1 ± 0.4	4.4 ± 0.4	6.1 ± 0.9	7.6 ± 0.1	—
		300 p.p.m.	—	4.2 ± 0.6	5.8 ± 1.0	7.7 ± 1.0	7.6 ± 1.4
Fatty acid amide sulfonate 1	31.9	Distilled	5.9 ± 1.4	12.2 ± 0.4	12.7 ± 1.3	—	—
		150 p.p.m.	5.1 ± 0.1	6.7 ± 0.5	7.9 ± 0.7	9.2 ± 0.6	—
		300 p.p.m.	—	7.9 ± 1.5	8.1 ± 0.5	8.5 ± 0.8	7.6 ± 1.7
Polyglycyl ether 2	27.4	Distilled	4.9 ± 0.9	10.6 ± 0.5	12.1 ± 0.6	—	—
		150 p.p.m.	4.4 ± 0.3	10.0 ± 1.4	10.8 ± 2.0	12.7 ± 0.4	—
		300 p.p.m.	—	11.2 ± 1.5	11.2 ± 0.7	11.5 ± 1.3	12.5 ± 0.7

Temperature of detergent solution: 40° C.

Soap 1	92.5	Distilled	6.3 ± 0.7	10.6 ± 1.3	11.7 ± 2.0	—	—
		150 p.p.m.	2.7 ± 0.1	4.9 ± 0.6	9.4 ± 0.6	8.9 ± 1.5	—
		300 p.p.m.	—	4.0 ± 0.7	5.5 ± 1.0	9.9 ± 1.1	10.2 ± 1.6
Soap 2r	96.4	Distilled	5.8 ± 0.7	12.0 ± 1.1	13.2 ± 0.5	—	—
		150 p.p.m.	2.9 ± 0.6	4.8 ± 1.0	10.8 ± 0.5	9.9 ± 0.8	—
		300 p.p.m.	—	4.0 ± 0.6	4.4 ± 1.1	10.0 ± 1.5	10.4 ± 0.3
Built soap 1r	77.8	Distilled	6.1 ± 0.6	—	12.7 ± 0.5	—	—
		150 p.p.m.	3.1 ± 0.7	—	9.0 ± 1.7	10.4 ± 2.1	—
		300 p.p.m.	—	2.9 ± 0.4	3.7 ± 1.4	—	10.4 ± 0.9
Sodium lauryl sulfate 2	46.5	Distilled	3.8 ± 0.4	10.0 ± 0.4	10.8 ± 1.5	—	—
		150 p.p.m.	3.0 ± 0.4	5.1 ± 0.4	6.0 ± 0.8	6.2 ± 0.6	—
		300 p.p.m.	—	5.2 ± 1.3	5.0 ± 1.2	6.2 ± 1.1	5.9 ± 0.6
Alkyl aryl sulfonate 3	36.4	Distilled	3.5 ± 0.1	5.6 ± 0.2	6.3 ± 1.0	—	—
		150 p.p.m.	—	4.0 ± 0.8	4.3 ± 0.8	4.0 ± 0.7	—
		300 p.p.m.	—	3.8 ± 1.2	4.5 ± 1.3	4.5 ± 0.4	3.9 ± 0.5
Sulfated glyceryl ester 2	26.7	Distilled	4.0 ± 0.6	4.2 ± 0.6	5.2 ± 0.2	—	—
		150 p.p.m.	—	4.0 ± 1.0	5.2 ± 0.2	4.7 ± 0.8	—
		300 p.p.m.	—	3.1 ± 0.3	3.9 ± 1.0	4.6 ± 1.7	6.2 ± 0.6
Fatty acid amide sulfonate 1	31.9	Distilled	5.3 ± 0.3	7.6 ± 0.4	9.9 ± 0.9	—	—
		150 p.p.m.	4.3 ± 0.6	5.7 ± 0.5	6.4 ± 0.3	6.1 ± 0.8	—
		300 p.p.m.	—	5.1 ± 0.4	5.9 ± 0.7	5.8 ± 0.6	6.0 ± 0.9
Polyglycyl ether 2	27.4	Distilled	3.8 ± 0.5	9.0 ± 0.5	9.9 ± 0.1	—	—
		150 p.p.m.	5.1 ± 0.7	8.0 ± 1.0	7.4 ± 1.0	7.2 ± 0.9	—
		300 p.p.m.	—	6.2 ± 0.6	6.8 ± 0.9	6.8 ± 1.0	7.3 ± 1.5

washed separately in 100 ml. of detergent solution with ten ¼ inch steel balls in a pint jar in the launder-ometer for 15 minutes. The sample was removed from the jar, rinsed twice by dipping into water in beakers and twice for two minutes each in 100 ml. of water in the launder-ometer. Finally, each sample was spread flat on a glass plate, and when air dry, its light reflectance was again read in the same 5 places as before. In order to minimize the effect of background on light reflectance, each sample as read was backed by the other two samples making up the laundering replicate.

The difference (increase) between the light reflectance readings before and after laundering in the detergent solution is a measure of the soil removed and is called the "spread." The mean spread of the three samples used for each laundering replicate is given in Table III. Another value, the "soap index" (Table IV), is an estimate of the efficiency of the detergent being tested in relation to the soap used as the standard. It is obtained by dividing the mean spread of the detergent at a specified concentration, temperature and water hardness by the spread obtained with soap 1 at the same concentration and temperature in distilled water.

The soil-removing efficiency of 2 unbuilt and 1 built soap and 5 synthetic detergents, representative of different types, was determined according to the above procedure. Launderings were done at 60° and 40° C. in distilled water and in water of 150 and 300 parts per million (p.p.m.) hardness[5] in concentrations of 0.05, 0.10, 0.15, 0.25, 0.35 and 0.50 percent of the detergent as received. The additional detergents were evaluated at one temperature and one concentration—60° C. and 0.25 percent—in both distilled water and water of 300 p.p.m. hardness. A few launderings were also done with some synthetic detergents in water of 600 p.p.m. hardness.

Since the results obtained in evaluating detergents for their soil-removing efficiency may depend on the test fabric, additional launderings were done using G.D.C. printed soil cloth No. 26 *(38)*. Samples of this test material were laundered with soap 1 and the same 5 representative synthetic detergents used above at 40° C. in distilled water at 5 different concentrations (0.05, 0.15, 0.25, 0.35 and 0.50 percent) of the detergent as received. The same procedure was followed except that

[5] Hard water of 5000 parts, calculated as $CaCO_3$, per million parts of water was made by mixing 3.24 gm. $MgCl_2 \cdot 6H_2O$ dissolved in 500 ml. distilled water and 4.99 gm. $CaCl_2 \cdot 2H_2O$ in 500 ml. distilled water. Dilutions of this concentrated hard water (30 ml. and 60 ml. each diluted to 1000 ml. with distilled water) were used to make water of 150 p.p.m. and 300 p.p.m., respectively.

Table IV. Washing efficiency of detergents at 0.25 percent concentration in water of varying degrees of hardness at 60° C.

Detergent	Active ingredient	Soap index at 0.25 percent detergent as received: Distilled water	Hard water: 300 p.p.m.	Hard water: 600 p.p.m.
	Percent			
Anionic Detergents:				
Soaps				
Soap 1	92.5	1.00	0.31	0.20
Soap 2r	96.4	1.06	.27	—
Soap 3r	96.2	1.08	.24	—
Soap 4	95.5	1.15	.34	—
Soap 5	95.1	1.13	.40	—
Soap 6r	93.2	1.08	.21	—
Potassium oleate	79.8	.68	.35	—
Built soap 1r	77.8	1.06	.25	—
Built soap 2r	74.6	1.08	—	—
Built soap 3r	72.3	.98	.20	—
Built soap 4	72.0	.84	.27	—
Built soap 5r	68.4	.79	.16	—
Built soap 6r	58.5	1.08	—	—
Built soap 7r	57.3	.90	.24	—
Built soap 8r	54.8	1.02	.23	—
Soap powder 1	6.8[1]	.67	.25	—
Salts of alkyl sulfates				
Sodium lauryl sulfate 1	48.6	.68	.43	—
Sodium lauryl sulfate 2	46.5	.78	.57	.33
Sodium laury sulfate 3r	38.2	.83	.40	.32
Sodium lauryl sulfate 4	31.5	.48	.38	—
Sodium lauryl sulfate 5r	18.7[1]	.84	.53	.34
Sodium oleyl sulfate 1	27.2	.59	.34	—
Triethanolamine lauryl sufate 1r	18.8	.31	.25	—
Sodium salts of alkyl aryl sulfonates				
Alkyl aryl sulfonate 1	90.8	.48	.26	—
Alkyl aryl sulfonate 2	89.4	.57	.25	—
Alkyl aryl sulfonate 3	36.4	.45	.45	.20
Alkyl aryl sulfonate 4	36.2	.54	.27	—
Alkyl aryl sulfonate 5r	31.6	.58	.35	.18
Sodium salts of sulfated and sulfonated esters				
Sulfated glyceryl ester 1r	29.6	.67	.28	—
Sulfated glyceryl ester 2	26.7	.39	.37	—
Sulfonated ethyl ester 1	50.0	.63	.43	.35
Sodium salts of sulfated and sulfonated amines or amides				
Alkyl amine sulfate 1	12.8[1]	.47	.15	—
Alkyl amine sulfate 2	11.5[1]	.54	.24	—
Fatty acid amide sulfate 1	18.6	.20	.11	—
Fatty acid amide sulfate 2	8.9	.45	.23	—
Fatty acid amide sulfonate 1	31.9	.81	.52	.38
Fatty acid amide sulfonate 2r	30.4	.66	.31	.30
Fatty acid amide sulfonate 3	15.3	.70	.49	—
Cationic Detergents:				
Cetyl trimethyl ammonium bromide	98.8	.31	.33	—
Alkyl dimethyl benzyl ammonium chloride	21.8	.25	.28	—
Diethyl aminoethyl oleyl amide dimethyl sulfate	8.3	.23	.20	—
Non-ionic Detergents:				
Fatty acid amides				
Fatty acid diethanolamide 1	87.6	.64	.43	—
Fatty acid diethanolamide 2	87.5	.72	.43	—
Fatty acid diethanolamide 3	78.9	.73	.52	—
Polyethylene ether condensates				
Polyglycyl ester 1	98.3	.48	.27	—
Polyglycyl ester 2r	14.1[1]	1.09	.75	.57
Polyglycyl ester 3r	13.1[1]	1.01	.71	—
Polyglycyl ester 4r	12.5[1]	1.09	.65	.50
Polyglycyl ester 5	11.3[1]	—	—	.42
Polyglycyl ether 1	27.6	.75	.58	—
Polyglycyl ether 2	27.4	.77	.71	.55
Water	—	.17	.14	.13

[1] Built with 15 percent or more alkaline salts (as Na_2CO_3).

the washing time was 30 instead of 15 minutes.

Results and Discussion

THE DETERGENTS.—In Table I are given the results on the analyses of the soaps for: total active ingredient (anhydrous soap), moisture, insoluble filler, total salts, alkaline salts, sodium chloride, phosphate, free alkali, pH of a 1 percent aqueous solution, and titer of mixed fatty acids. Table II gives the results on the analysis of 35 synthetic detergents for: total active ingredient (pure detergent), soap and fatty matter, matter volatile at 105° C., matter insoluble in water, alkaline salts, neutral salts, sulfate, chloride, phosphate, and pH of a 1 percent aqueous solution. Results on analyses for free acid (or free alkali) are not reported since in many cases they were unreliable.

It is evident from the tables that the percent active ingredient for both the soaps and synthetic detergents varies widely. However, since substances such as neutral and alkaline salts are known to affect the ability of detergents to remove soil from fabric *(2, 21, 22, 36)*, the solution concentrations used in this study were based on the detergents as received rather than on the percent active ingredient.

EFFECT OF RELATIVE HUMIDITY ON THE SOILED TEST CLOTH.—Since it was known that atmospheric moisture affects the preparation of the soiled test cloth *(26)*, the relative humidity of the laboratory at the time of soiling was recorded. It was found that test fabric, soiled on days when the relative humidity was approximately 22, 40, 50, 58, and 85 percent and processed according to the established procedure, had light reflectance measurements of 21.0, 21.6, 23.8, 25.4, and 26.4 percent, respectively. By statistical analyses the differences in light reflectance between the strips of soiled fabric (except between the first two) were significant. Also each strip was uniformly soiled since the coefficients of variation in light reflectance were low, varying from 1.3 to 2.7 percent.

When samples of these strips of soiled fabric prepared at the 5 relative humidities were laundered with 0.25 percent concentration of soap 1 in distilled water at 60° C., their light reflectance increased to 40.5, 39.8, 39.5, 38.3, and 36.1 percent, respectively, giving the corresponding spread values of 19.5, 18.2, 15.7, 12.9 and 9.7. Apparently with increasing relative humidity at the time of soiling, less soil was held on the fabric. Also, as indicated by tests with soap 1, the soil was held more firmly, since less was removed on laundering.

Spread values for other detergents evaluated with these 5 strips of soiled fabric indicated that the order of efficiency of the detergents in removing soil, also their soap index values, were much the same. It would seem, therefore, that if the test cloth is soiled under different moisture conditions comparable results in evaluating the soil-removing efficiency of detergents can be obtained by use of the soap index value.

EVALUATION OF DETERGENTS WITH TEST CLOTH SOILED IN THIS LABORATORY.—Table III gives the soil removed on laundering the test cloth with 3 soaps:—soap 1, soap 2r and built soap 1r; and 5 representative synthetic detergents:—sodium lauryl sulfate 2, alkyl aryl sulfonate 3, sulfated glyceryl ester 2, fatty acid amide sulfonate 1, and polyglycyl ether 2. Results are reported in terms of the mean spread and the standard deviation.

For the most part low mean spread values had low standard deviations whereas high mean spreads tended to have high standard deviations. In a majority of cases the variation between replicates of the spreads was not significant. Also, since the

variation between replicates was less at 60° C. than at 40° C. it would seem that the removal of soil on laundering was more uniform at the higher temperature.

In distilled water, the 3 soaps improved in efficiency with increasing amounts of soap throughout the range studied. In water of 150 p.p.m. hardness, solutions of soap up to 0.15 percent were no more effective than water alone in removing soil. In water of 300 p.p.m. hardness the same was true of concentrations up to 0.25

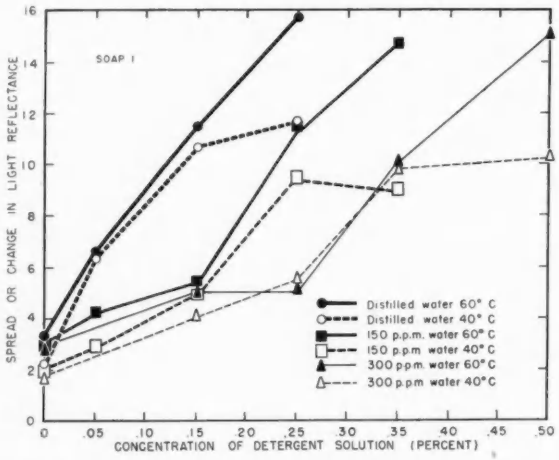
SOAP 1
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Distilled water 60° C
Distilled water 40° C
150 p.p.m. water 60° C
150 p.p.m. water 40° C
300 p.p.m. water 60° C
300 p.p.m. water 40° C

Figure 4. Soil removed on laundering soiled fabric with soap 1 in distilled water and water of 150 p.p.m. and 300 p.p.m. hardness at 60° and 40° C.

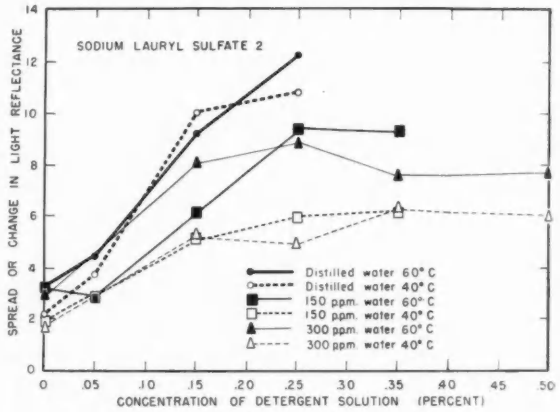
SODIUM LAURYL SULFATE 2
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Distilled water 60° C
Distilled water 40° C
150 ppm. water 60° C
150 ppm. water 40° C
300 ppm. water 60° C
300 ppm. water 40° C

Figure 5. Soil removed on laundering soiled fabric with sodium lauryl sulfate 2 in distilled water and water of 150 p.p.m. and 300 p.p.m. hardness at 60° and 40°C.

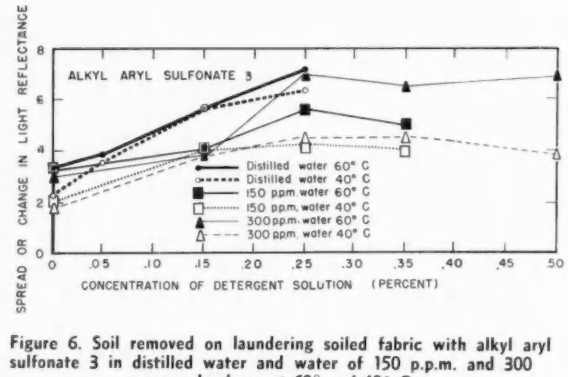
ALKYL ARYL SULFONATE 3
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Distilled water 60° C
Distilled water 40° C
150 ppm. water 60° C
150 ppm. water 40° C
300 ppm. water 60° C
300 ppm. water 40° C

Figure 6. Soil removed on laundering soiled fabric with alkyl aryl sulfonate 3 in distilled water and water of 150 p.p.m. and 300 p.p.m. hardness at 60° and 40° C.

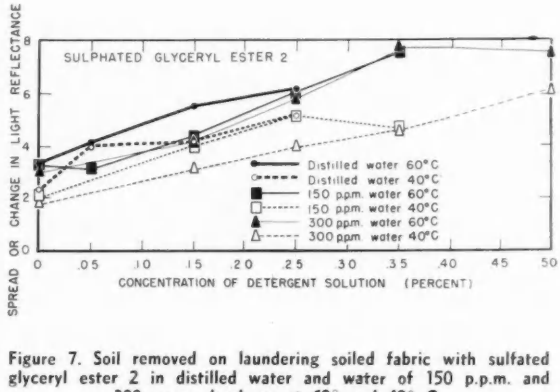
SULPHATED GLYCERYL ESTER 2
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Distilled water 60° C
Distilled water 40° C
150 ppm. water 60° C
150 ppm. water 40° C
300 ppm. water 60° C
300 ppm. water 40° C

Figure 7. Soil removed on laundering soiled fabric with sulfated glyceryl ester 2 in distilled water and water of 150 p.p.m. and 300 p.p.m. hardness at 60° and 40° C.

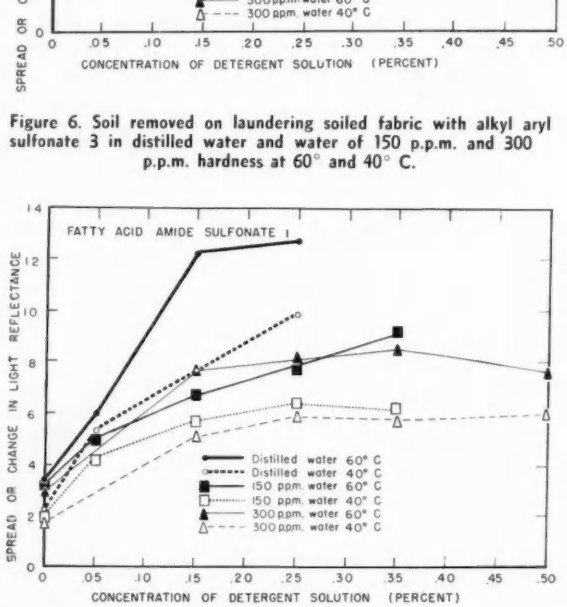
FATTY ACID AMIDE SULFONATE 1
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Distilled water 60° C
Distilled water 40° C
150 ppm. water 60° C
150 ppm. water 40° C
300 ppm. water 60° C
300 ppm. water 40° C

Figure 8. Soil removed on laundering soiled fabric with fatty acid amide sulfonate 1 in distilled water and water of 150 p.p.m. and 300 p.p.m. hardness at 60° and 40° C.

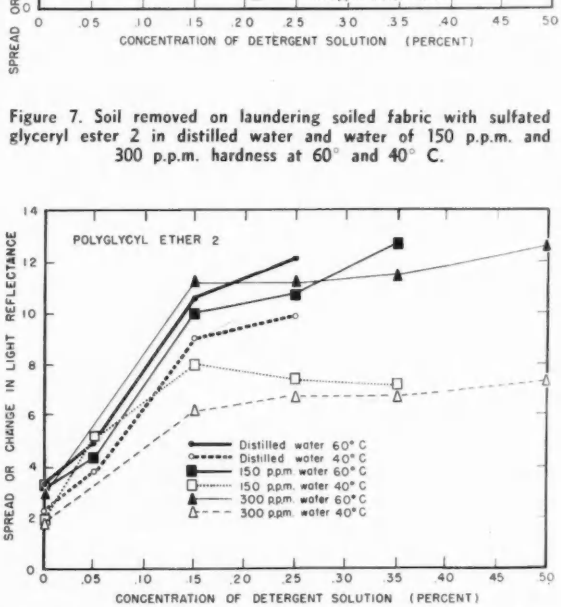
POLYGLYCYL ETHER 2
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Distilled water 60° C
Distilled water 40° C
150 ppm. water 60° C
150 ppm. water 40° C
300 ppm. water 60° C
300 ppm. water 40° C

Figure 9. Soil removed on laundering soiled fabric with polyglycyl ether 2 in distilled water and water of 150 p.p.m. and 300 p.p.m. hardness at 60° and 40° C.

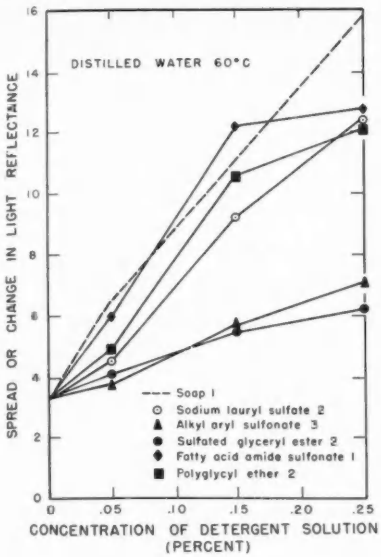
DISTILLED WATER 60°C
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Soap 1
Sodium lauryl sulfate 2
Alkyl aryl sulfonate 3
Sulfated glyceryl ester 2
Fatty acid amide sulfonate 1
Polyglycyl ether 2

Figure 10. Soil removed on laundering soiled fabric with soap 1, sodium lauryl sulfate 2, alkyl aryl sulfonate 3, sulfated glyceryl ester 2, fatty acid amide sulfonate 1, and polyglycyl ether 2 in distilled water at 60° C.

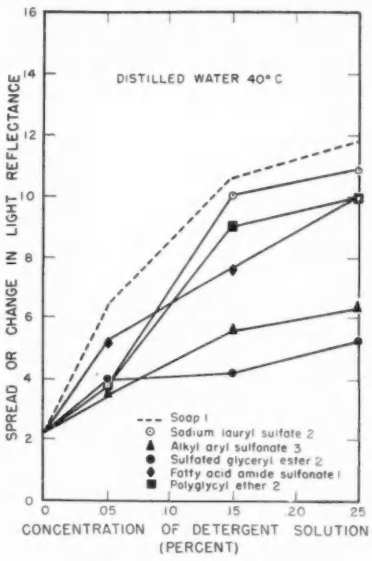
DISTILLED WATER 40°C
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Soap 1
Sodium lauryl sulfate 2
Alkyl aryl sulfonate 3
Sulfated glyceryl ester 2
Fatty acid amide sulfonate 1
Polyglycyl ether 2

Figure 11. Soil removed on laundering soiled fabric with soap 1, sodium lauryl sulfate 2, alkyl aryl sulfonate 3, sulfated glyceryl ester 2, fatty acid amide sulfonate 1, and polyglycyl ether 2 in distilled water at 40° C.

percent. At the highest soap concentration used with each water, the three soaps removed considerably more soil at 60° C. than at 40° C. and the amount of soil removed in the hard waters paralleled the values obtained in distilled water. At 40° C. soil removal for these soaps tended to level off.

At 60° C. the soap used as the standard, soap 1, had approximately the same soil-removing efficiency at 0:15 percent concentration in distilled water as at 0.25 percent in 150 p.p.m. water and 0.35 percent in water of 300 p.p.m. hardness (Figure 4). At 0.25 percent concentration in 150 p.p.m. and 300 p.p.m. water this soap was 72 and 31 percent, respectively, as efficient as in distilled water.

Figures 5 through 9 show the soil removed on laundering the test fabric with each of the 5 synthetic detergents. Under the conditions of test the soil-removing efficiency of these synthetics in distilled water, like the soaps, improved with increasing concentration of detergent up to 0.25 percent. But in the hard waters soil removal for most of the detergents began to level at 0.15 or 0.25 percent concentration and additional amounts had little effect.

Sodium lauryl sulfate 2 (Figure 5) in distilled water removed about as much soil at 60° C. as at 40° C. However, in the hard waters it was considerably more effective at the higher temperature and the amount of hardness (150 p.p.m. or 300 p.p.m.) made little difference.

Both alkyl aryl sulfonate 3 (Figure 6) and sulfated glyceryl ester 2 (Figure 7) removed almost as much soil in hard water as in distilled and only slightly more at 60° C. than at 40° C. Compared to the other synthetics these products were the least efficient and showed less improvement in soil removal with increasing concentration of detergent.

Fatty acid amide sulfonate 1 (Figure 8) and polyglycyl ether 2 (Figure 9) were considerably more effective at 60° C. than at 40° C. Furthermore, the latter detergent at 60° C. was equally efficient in hard water and distilled water. Both detergents were more efficient than alkyl aryl sulfonate 3 and sulfated glyceryl ester 2, although the percent active ingredient in the four detergents was approximately the same.

Figures 10 through 13 show the soil removed by the 5 synthetic detergents compared to the standard soap. Under the conditions of this experiment the 5 synthetic detergents in distilled water at both 60° and 40° C. were, generally, less effective in removing soil from the test fabric than the standard soap. On the other hand, in the hard waters the reverse was true at concentrations lower

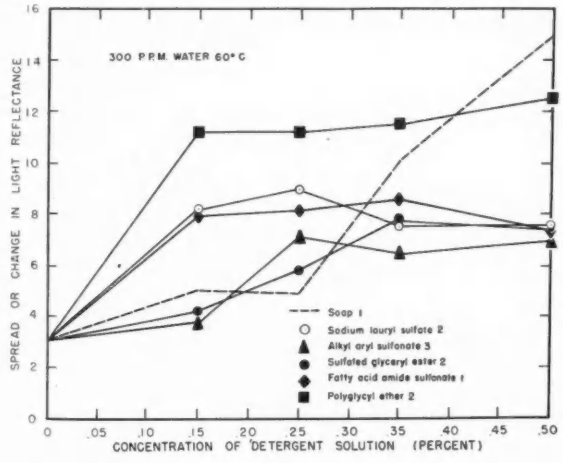
300 P.P.M. WATER 60°C
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Soap 1
Sodium lauryl sulfate 2
Alkyl aryl sulfonate 3
Sulfated glyceryl ester 2
Fatty acid amide sulfonate 1
Polyglycyl ether 2

Figure 12. Soil removed on laundering soiled fabric with soap 1, sodium lauryl sulfate 2, alkyl aryl sulfonate 3, sulfated glyceryl ester 2, fatty acid amide sulfonate 1, and polyglycyl ether 2 in water of 300 p.p.m. hardness at 60° C.

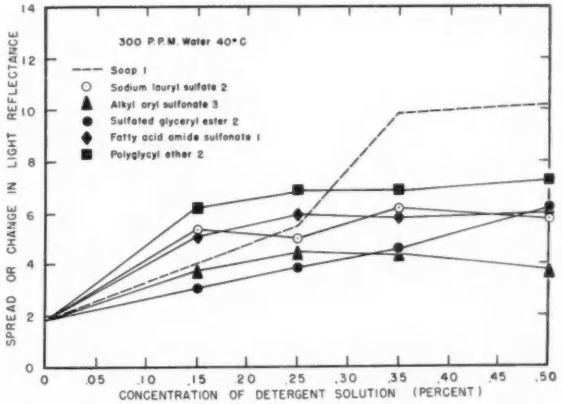
300 P.P.M. Water 40°C
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
Soap 1
Sodium lauryl sulfate 2
Alkyl aryl sulfonate 3
Sulfated glyceryl ester 2
Fatty acid amide sulfonate 1
Polyglycyl ether 2

Figure 13. Soil removed on laundering soiled fabric with soap 1, sodium lauryl sulfate 2, alkyl aryl sulfonate 3, sulfated glyceryl ester 2, fatty acid amide sulfonate 1, and polyglycyl ether 2 in water of 300 p.p.m. hardness at 40° C.

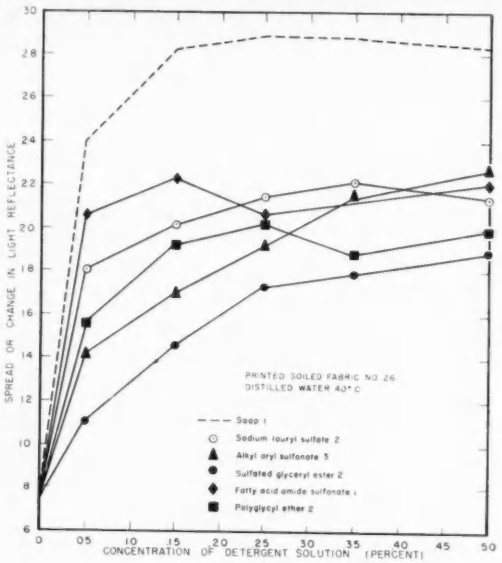
SPREAD OR CHANGE IN LIGHT REFLECTANCE
CONCENTRATION OF DETERGENT SOLUTION (PERCENT)
PRINTED SOILED FABRIC NO. 26
DISTILLED WATER 40° C
Soap 1
Sodium lauryl sulfate 2
Alkyl aryl sulfonate 3
Sulfated glyceryl ester 2
Fatty acid amide sulfonate 1
Polyglycyl ether 2

Figure 14. Soil removed on laundering G.D.C. printed soil fabric No. 26 with soap 1, sodium lauryl sulfate 2, alkyl aryl sulfonate 3, sulfated glyceryl ester 2, fatty acid amide sulfonate 1, and polyglycyl ether 2 in distilled water at 40° C.

than 0.35 percent in a majority of the cases.

In Table IV is reported the soil-removing efficiency of these and additional soaps and synthetic detergents compared to the standard soap. They were evaluated at 60° C. and 0.25 percent detergent (as received) in distilled water and water of 300 p.p.m. and 600 p.p.m. hardness. The results were expressed as soap index values, that is, the efficiency of the detergent in terms of that of the standard soap in distilled water. In general, differences in index value of 0.14 and above were significant. Inspection of the data indicates no correlation between percent active ingredient and soap index.

In distilled water the soaps without builder, except potassium oleate, were as efficient as the standard. Built soaps 4 and 5r were somewhat less effective but the other built soaps removed as much soil as the standard. The soap powder, which has only 6.8 percent soap and a high phosphate content of 24.5 percent (as P_2O_5), was two-thirds as effective as soap 1. In the hard water there was little difference between the soaps.

Of the synthetic detergents tested the three non-ionic synthetics, polyglycyl ester 2r, 3r, and 4r, were the most efficient in removing soil from the test fabric. In distilled water they were as effective as the standard soap. In hard water they retained much of their soil-removing ability since their index values in 300 p.p.m. and 600 p.p.m. water ranged from 0.65 to 0.75 and from 0.50 to 0.57, respectively. Also they were more than twice as efficient as soap 1 in hard water, since the corresponding index values for this soap were 0.31 and 0.20, respectively. In this connection it may be noted that these products contain about 13 percent active ingredient and 25 percent phosphate (as P_2O_5). Also 2 of the 3 contain as much as 35 percent matter insoluble in water. However, polyglycyl ester 1, a concentrated liquid with no builders, was less than half as effective as the other esters. The polyglycyl ethers which have 27 percent active ingredient and no builders, were three-fourths as effective as polyglycyl ester 2r, 3r, and 4r, in distilled water and about equally as efficient in the hard waters. The fatty acid diethanolamides which contain about 80 percent active ingredient, were slightly less effective than the polyglycyl ethers.

Of the anionic synthetic detergents those classified as salts of alkyl sulfates and sodium salts of sulfated and sulfonated amides or amines were, in general, more efficient both in distilled and hard water than the sodium salts of alkyl aryl sulfonates and the sodium salts of sulfated and sulfonated esters. The detergent, sodium lauryl sulfate 5r, which contains about 19 percent active ingredient and 29 per cent phosphate (as P_2O_5) was as effective as sodium lauryl sulfate 3r which has 38 percent active ingredient and no phosphate. In distilled water the products, alkyl aryl sulfonate 5r, sulfated glyceryl ester 1r, and fatty acid amide sulfonate 2r, which contain about 30 percent active ingredient and 65 percent neutral salts, were from 58 to 67 percent as effective as the standard. In hard water they removed no more soil than soap 1.

The cationic synthetic detergents were the least effective of the detergents tested and in distilled water were only 23 to 31 percent as effective as the standard soap.

EVALUATION OF DETERGENTS WITH G.D.C. PRINTED SOIL CLOTH NO. 26.—Figure 14 shows the soil removed[6] on laundering the printed soil cloth No. 26 with soap 1 and the 5 synthetic detergents previously evaluated at concentrations from 0.05 to 0.50 percent. The results indicate that for all concentrations the soap was more effective in removing soil than the synthetics. This is in agreement with results obtained with the soiled test fabric produced in this laboratory (Figure 11). Also the order of efficiency of the detergents in removing soil from the two fabrics was much the same. For instance, at the 0.15 percent concentration index values with the printed soil cloth No. 26 for sodium lauryl sulfate 2, fatty acid amide sulfonate 1, polyglycyl ether 2, alkyl aryl sulfonate 3 and sulfated glyceryl ester 2 were 0.72, 0.79, 0.68, 0.60 and 0.52, respectively, whereas with the fabric soiled in the Bureau's laboratory the corresponding values were 0.94, 0.72, 0.85, 0.53 and 0.40. At the 0.25 percent concentration the values for the printed cloth were 0.74, 0.72, 0.70, 0.66, and 0.60 and for the Bureau's fabric 0.92, 0.85, 0.85, 0.54, and 0.44. These values also show that the differentiation between the five synthetic detergents is less with the G.D.C. printed soil cloth No. 26 than with the fabric soiled in this laboratory.

Summary

In this study of the efficiency of soaps and synthetic detergents for use in the home laundering of fabrics 15 soaps, 1 soap powder, and 35 synthetic detergents were evaluated for their effectiveness in removing soil under standardized conditions. The detergents were analyzed chemically and classified according to the type of active ingredient present.

The change in light reflectance which the detergents produced in the laundering of artificially soiled cotton fabric was used as a measure of their soil-removing efficiency. Samples of the test fabric were laundered in the launder-ometer with 3 soaps and 5 synthetic detergents, representative of the various classes, at 60° and 40° C. for 15 minutes in distilled water and in water of 150 p.p.m. and 300 p.p.m. hardness at 5 different concentrations of

[6]Unpublished data obtained in this laboratory with G.D.C. printed soil cloth No. 26.

the detergent as received. The additional detergents were evaluated at one temperature and one concentration in both distilled and hard water. One soap was used as the standard and all detergents compared to it.

Under the conditions of this study the soaps removed considerably more soil at 60° C. in both distilled and hard water than at 40° C. In general, the synthetic detergents were also more effective at 60° C. than at 40° C. and less effective in distilled water than the soaps. On the other hand, in hard water the synthetic detergents in a majority of cases were more effective than the soaps, especially at concentrations lower than 0.35 percent.

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Petroleum Solvents—

(Continued from Page P750)

into the fibers of the cloth and hence loss of color value. There is apparently less available pigment on the cloth surface where it must be for maximum color effect. Loss of body because of too low a thinner solvency is also associated with an unstable emulsion. Such instability seems to cause a non-uniform film to be formed on the cloth surface which would again be reflected in poor color strength.

EFFECT OF THINNER COMPOSITION ON PRINTING CHARACTERISTICS OF ARIDYE CONCENTRATES.—Only those emulsions which showed stability equivalent to, or greater than, the control, Blends 14, 17, 18 and 22, were evaluated with respect to color value of the final print. These evaluations were made by visual examination and compared to prints which were prepared from emulsions containing the control thinner. Printing cuts containing Blends 14, 17 and 18 were all about equivalent to the control while the cut containing Blend No. 22 showed poor strength. This is in excellent agreement with the measurements of color value by means of a reflectometer of the Sherdye test prints where essentially equal reflectance was found for the cuts containing Blends 14, 17 and 18 but a high reflectance value, that is, poor strength, for the emulsion prepared with Blend No. 22. It might be inferred in view of this excellent agreement that, while Blend No. 23 exhibited very slightly less emulsion stability than did the control, it would very likely show improved color value. The similarity of performance of the various experimental thinners in both these concentrates where direct comparison is available, would make it unlikely that the composition of the thinner found to be optimum with the Sherdye concentrates would be different for the Aridye concentrates.

Summary and Conclusion

While there can be little question of the necessity of employing a hydrocarbon thinner boiling in the mineral spirits range, 300°-400° F., in order to obtain reasonably fast evaporation rate but maintaining a 100° F. minimum flash point, data are presented to show that the relative concentrations of the three hydrocarbon types found in these petroleum type solvents is also important in obtaining optimum performance of the pigmented emulsions. A mineral spirits having 16-20% aromatic components with the balance made up of equivalent volumes of paraffins and naphthenes give the best overall performance. Supporting conclusions may be summarized as follows:

(1) The body of the emulsion, which to some extent is a controlling factor in textile penetration, is directly effected by solvent composition.

(2) Both high and low aromatic concentrations result in excessive thinning of the emulsion.

(3) High concentrations of paraffins especially at low aromatic levels result in unstable as well as thin emulsions.

(4) The stability of emulsions are greatest at high aromatic and/or naphthene concentrations, but such increased stability is always associated with a loss in body.

(5) The optimum color strength attainable is not the same for different paraffin/naphthene ratios and is greatest at a paraffin/naphthene ratio of about 1:1.

(6) At a paraffin/naphthene ratio of about 1:1 the maximum strength is at-

tained at an aromatic concentration of about 16-20%.

(7) The composition which results in maximum color strength corresponds to the composition which gives the optimum balance of good body with reasonably high stability.

References

(1) Am. Soc. Testing Materials, Standards on Petroleum Products and Lubricants, pp. 155-6 (A.S.T.M. D. 235-39), 1947.
(2) Ibid, pp. 444-451, 1947.
(3) Ward, A. L., and Kurtz, S. S., Ind. Eng. Chem., Anal. Ed., *10*, 559 (1938).

Textile Printing—

(Concluded from Page P747)

The engraving would have to come in for its share of attention. The engraver should be compelled to standardize his work so that etching would be uniform, and engraving uniformly near to surface or as specified by the printer. There is no doubt that the printing of a pattern could be made much more easy if progressive allowance could be made for each roller, so that the pattern would more readily fit. This could be employed readily by printers engaged in their own work, but the commission printer is constantly faced with roller reverses which he cannot well avoid. Any reverse would throw out the whole scheme.

Particular attention would have to be given to the width of cloth coming to the machine. This is extremely important, because if the goods should be framed out several inches wider than the width after bleaching or boiling off, there would always be a marked tendency to shrink to the boiled off width. This causes the pattern to go out of fit, as the goods gradually shrink in width from roller to roller in attempting to return to boiled off width.

In the case of pigment white and the emulsion type paste used on engravings which consume a very small amount of color, it might be well to consider the use of a dam rather than a color box and the furnisher. These dams have been used on special type printing machines for printing lacquer on very fine engravings. By the use of such an aid there would be very little color in the dam at one time. Furthermore, by not having a furnisher, there would be no churning around and hence less tendency to break down the emulsion.

Too little consideration has been given to the surface tension of the printing medium. It is possible that with a very penetrable paste, very little set would be required for even heavy patterns. Efforts expended on this line of investigation might be fruitful indeed, particularly if it became possible to operate with lighter pressures.

I am sure that you will all agree that if everything pertaining to the print machine, the engraving and the cloth and color coming to the machine were standardized, then conditions which prevail at one time would prevail at all times. If the ideal conditions are found, then it should be always possible to have a minimum of difficulty.

Let us consider the paper printer. He operates at a tremendously greater speed, and keeps on running for hours without apparent difficulty. While I appreciate that paper printing and fabric printing are not analogous by any means inasmuch as paper has fixed dimensions, the paper printer has, however, standardized the engraving and the materials used in carrying his color to such an extent that it is practically a straight line operation. The only way for the textile printer to overcome many of the same difficulties is to get nearer to standardization. Thinking of paper makes me wonder if we do not try to do too much with our orthodox printing machine. For instance, the wall paper industry uses a rotary type printing machine with rolls engraved in relief, the rolls being assembled around the cylinder in much the same way as the textile printing machine. Many of our illustrations and the "funnies" are printed on the rotogravure machine which has its nips spaced far apart on individual cylinders. Here photo-engraving is used intaglio. Paper for illustration is also printed by the lithographic process. On the contrary, we insist on trying to do every type of work on one single type machine.

In dyeing we do not attempt to dye a matelasse on a jig or smooth face satin in a dye box. We even make use of different types of equipment for the same material and types of dyeing, where differences in quantity are involved. For instance, if we were to vat dye only a short quantity of material we would no doubt use a pad, or a jig, or a combination of both. If, however, we had a long run using the same color and same material, we would no doubt use the continuous dyeing machine. Apparently we expect too much from one type of machine in printing.

If part of the answer lies in the type of standardization, is the cure worth the price? For the plant engaged in standard fabrics the price is not too high; or in a plant doing several types of work where one or more machines can be confined to standard lines, there could be economy through standardizing the machine and its appurtenances. However, for the plant engaged in printing a wide variety of styles and fabrics, standardization would bring little or no return. The only solution here would be the previously mentioned suggestion of keeping certain machines for certain styles. This no doubt would mean operating only part of the machines at one time, and moving the printers to different machines when necessary.

In summarizing, it is my feeling that printing is really a skill of the highest order. The printer is constantly under pressure to get production and to keep the machine constantly operating, and at the same time cope with all kinds of difficulties to produce perfect goods. Over many of these difficulties he has no control. He may be printing with good results, when a change in backgrey, or even a seam, may throw his machine out of fit. He must be constantly on the alert for these difficulties. The mystery is that we can do so many things and do such excellent work, fitting patterns requiring fine tolerances but using equipment with tolerances so gross.

Membership Applications

(Concluded from Page P744)

Oliver S. Sprout, Jr.—Research Chemist, Pennsylvania Salt Mfg. Co., Philadelphia, Pa. Sponsors: E. S. Garverich, L. C. Dormuth.

Rufus Taylor—Boss Dyer, Rhode Island Lace Works, West Barrington, R. I. Sponsors: M. H. Cooper, J. K. Wilkie.

Walter L. Thornburg—Supt., Cone Finishing Company, Greensboro, N. C. Sponsor: M. M. McCann.

Pieter G. Tiemstra—Dyer, N. V. Gebrs. v.d. Bergh's Royal Mills, Oss, Holland. Sponsors: H. C. Krijgsman, W. B. Wilson.

Joseph F. Vanden Bergh—Dyer, N.V. Gebrs. v.d. Bergh's Royal Mills, Oss, Holland. Sponsors: H. C. Krijgsman, W. B. Wilson.

Georgia E. Wright—Asst. Professor, Texas Technological College, Lubbock, Texas. Sponsors: C. W. Dorn, J. R. Bonnar.

William C. Wurth—Dyer, Claussner Hosiery Co., Paducah, Ky. Sponsors: E. F. Smith, J. Nerl.

JUNIOR

Madhusudan N. Bhagwati—Trainee, Calco Chemical Division, American Cyanamid Co., Bound Brook, N. J. Sponsors: R. R. Sleeper, C. C. Kerns.

TRADE NOTES • NEW PRODUCTS

Correction

The title of the patent on page 697, October 18th issue, which now reads "Shrinkproofing Oil—Alcohol and Alkali Combined" should, of course, read "Shrinkproofing Wool—Alcohol and Alkali Combined".

• Research and Science Building, Cluett, Peabody

Executives of other companies, heads of several colleges, and members of the press were guests at the formal opening of Cluett, Peabody & Co., Inc.'s new Research and Science Building in North Troy, New York, on September 27th.

As part of the day's program, a luncheon was held at the Troy Country Club with Dr. Claudius T. Murchison, president of the Cotton-Textile Institute, New York City, as guest speaker.

Through the morning and afternoon, guests were taken on conducted tours through the three main parts of the new structure—the offices, the research and development laboratories, and the pilot plant.

Built at a cost of over a million dollars (construction was started a year ago), the building is 187 feet across the front and about 250 feet deep and is of structural steel and metropolitan yellowstone brick.

"The opening of the new Research and Science Building is significant not only to Cluett, Peabody & Co., Inc., but to the whole industry as well, since a number of the research projects planned are directed toward new developments and solution of problems that concern the entire textile industry," E. C. Pfeffer, Jr., director of research, pointed out.

The Company has long recognized the value of research and established a research department years ago, Mr. Pfeffer added. The new building had been in blueprint form for many years, but final construction was delayed because of the shortage of essential building materials following the war, it was explained. With the new building being complete, now the Company has extensive facilities for large scale projects, Mr. Pfeffer said.

The Company's Research Division is divided into four functional groups. Three of these are research groups responsible for Fundamental Research, Chemical Process Research, and Textile Research. The fourth is the Standards Testing Laboratory which is responsible for the maintenance of the quality of all raw materials entering into the manufacture of Arrow products or in use by Cluett, Peabody & Co., Inc., plants, it was explained.

The Research Division has two service sections, the Machine Shop and the Drafting Room which supply mechanical drawings and machinist services to the Research Divisions and to the Standards Testing Laboratories. These service groups also work on mechanical developments requested or suggested by the Manufacturing Division.

"In the past, our Company has made important contributions to the textile industry, one of the most noteworthy of these being the mechanical compressive shrinking process invented by Sanford L. Cluett, a vice president of the Company. Cotton cloth processed through compressive shrinking machines bear the 'Sanforized' label, a trademark known around the world," Mr. Pfeffer said.

Research projects now in process by Cluett, Peabody & Co., Inc., are those concerned with the stabilization of rayon fabrics, the stabilization of woolen fabrics, the development of crease resistance in cotton fabrics, improvement in the luster and appearance of cotton fabrics. These projects are the type which result in chemical processes to accomplish the desired objective.

Textile research projects currently being conducted include those concerned with the development of improved means of processing fibers, and in general, those directed toward the development of improved methods of manufacturing spun yarns.

Also, several interesting projects concerned specifically with the Company's manufacturing and merchandising activities are in progress.

• Mathieson Appointment

Harry P. Smith, above, formerly New York District Sales Manager of Mathieson Chemical Corporation, has been made Assistant General Manager of Sales, it is announced by E. E. Routh, Vice President and Director of Sales. His headquarters will remain in the company's New York offices.

A native New Yorker, Mr. Smith graduated from Columbia with a B.S. degree in 1921. Prior to joining the Mathieson sales department in 1944, he was President of the George Chemical Company, now a division of Diamond Alkali Company. He is a member of the Chemical Salesmen's Association of New York and Alkali Distributors of the New York Metropolitan Area.

• Vice President, U. S Testing

James A. Nary, formerly of Chicago, has been made vice president in charge of production of the United States Testing

New Research and Science Building of Cluett, Peabody & Co., Inc.

Company, Inc., Hoboken, N. J., according to an announcement just made by A. L. Brassell, president. Mr. Nary will make his headquarters in Hoboken, and in addition to his work of coordinating the activities of the various divisions of the company, will also supervise the company branch laboratories in New York, Boston, Chicago, Woonsocket, R. I., Philadelphia and Los Angeles. The laboratories in the headquarters plant include chemical, bacteriological, engineering—both mechanical and electrical, textiles and leather.

Mr. Nary joined the company in 1922, shortly after graduating from the Lowell Textile Institute. His first job was in general testing, then selling and later was grading raw silk. In 1926, he was sent to Chicago to open a branch laboratory, the company's first step westward. With the exception of one year, when he was sent to China on a special mission in connection with the company's Shanghai, China, branch laboratory, Mr. Nary has been in continuous charge of the Chicago branch.

He is responsible for the large quality control laboratories which the United States Testing Company installed in Butler Bros., the great wholesale mail order house, and Wieboldt Stores, Inc., one of Chicago's major department stores. Another control operation was a testing project for one of the large retail mail order houses in Chicago.

• Mathieson Booklet

"Mathieson Chlorine" is the title of a new booklet published by Mathieson Chemical Corporation. The 36-page booklet is intended primarily to provide information on the proper handling of liquid chlorine. Subjects covered include the shipment and storage of liquid chlorine with data on chlorine cylinders, ton containers, and tank cars, methods of handling dry and moist chlorine, and safety in the use of chlorine, including first aid for chlorine exposure.

The booklet also contains detailed information on the physical properties of chlorine, including tables and charts listing the vapor pressure, density, specific volume, viscosity, specific heat and surface tension of liquid chlorine at various temperatures.

Copies of the booklet are available on request to the company headquarters at 60 East 42nd Street, New York 17, N. Y.

• Joins Sylvania

Jack E. Kempton has joined Sylvania Division American Viscose Corporation as a salesman attached to the Division's Chicago office.

• Corn Products Appointment

W. H. Gamble, President, Corn Products Sales Company, announced recently the appointment of R. C. Gralow, above, as Sales Manager of the Chemical Sales Department.

Mr. Gralow joined the Company immediately upon his graduation, in 1934, from the University of Wisconsin. He was assigned first to the Argo, Illinois plant of Corn Products, as a member of the Technical Sales and Service Group. In 1939, Mr. Gralow was transferred to New York Office. Since that time he has been closely associated with the administration and selling activities of the Chemical Sales Department.

A graduate of the University of Missouri in 1942, Mr. Kempton was a lieutenant in the Navy during the war and was associated with Stern Brothers and Company, investment bankers, Kansas City, until May of this year.

• Sindar Catalog

A new price list and catalogue, issued by Sindar Corporation of New York, manufacturers of industrial aromatics and chemicals, is divided into five sections, devoted to odors for industry, aromatic chemicals, germicides and fungicides, stabilizers and anti-oxidants, and anti-skinning agents. Information on use and cost for each product is given.

In the section on odors for industry, products for deodorization and reodorization are listed and recommended for some nineteen basic industrial commodities, such as paint, rubber, paper, adhesive, and textile.

"As industrial development has become increasingly complex," an introductory note in the price list states, "so has the solving of its corresponding odor problems." Individual odor difficulties may be encountered that require laboratory services to investigate the product and to develop special deodorant or reodorant, according to its needs.

In the section on germicides and fungicides, Sindar offers Compound G-4, in a pure and technical form, the two differing only in odor and color. This product is also available in aqueous solution. It is stated that Compound G-4 has been successfully used for mildewproofing textiles and leather goods, for slime control, and for the preservation of papermakers' felts. Both these materials are chlorinated phenolic compounds.

A group of stabilizers and anti-oxidants, it is claimed, will prove particularly effective for economical stabilization of textile oils, starches, sulfonated vegetable oils, and animal fats.

• Staley Appointments

Appointment of three salesmen to the industrial sales division of A. E. Staley Manufacturing Co., Decatur, Ill., has been announced by Paul Doolen, industrial sales manager.

Herbert J. Wallner, who will work out of the New York office, was formerly with C. W. Abbott & Co. of Baltimore.

James Turek, Jr., Hollywood, Calif., assigned a territory in the West Coast district, was formerly with Stein Hall Co., Inc., New York.

Walter C. Moore, who will work out of the Decatur office, was with Shellabarger Mills of Decatur.

• "Karbate" Pipe and Fittings Catalog

An illustrated descriptive booklet covering National Carbon Company's "Karbate" brand Pipe and Fittings is now available. The booklet contains detailed engineering information on "Karbate" pipe and fittings, including comprehensive tables of the chemical and physical properties of the material. All pipe sizes and fittings are illustrated and cross-section drawings show dimensions, assemblies, joining recommendations and other details to aid design work and to facilitate ordering.

"Karbate" impervious graphite resists the action of most acids, alkalies and other chemicals which are not highly oxidizing in their behavior. It may be used under conditions which keep the temperature in the body of the material below 338 deg. F. (170 deg. C.); it resists thermal shock, is light in weight and has good mechanical strength.

A copy of *Catalog Section M-8800B* may be obtained by writing National Carbon Company, Inc., 60 East 42nd St., New York 17, New York.

• Booklet on Syn-O-Tol CR

E. F. Drew & Co., Inc., Boonton, New Jersey has issued a four page pamphlet descriptive of Syn-O-Tol CR, a highly concentrated, non-sulfonated cocoanut amide condensate.

Syn-O-Tol CR is said to be an efficient and economical detergent for all wet cleaning operations. It is stated that fibers scoured with Syn-O-Tol CR are clean, absorbent, and ready for dyeing or other subsequent operations. Of additional interest is freedom from the harshening action.

It is claimed that Syn-O-Tol CR, in addition to its effectiveness when used alone, is a valuable adjunct to systems containing soap or synthetic detergents.

Copies of the pamphlet will be supplied upon request.

• Conco Anti Fume NS

Conco Anti Fume NS, a new gas fading inhibitor is announced by Continental Chemical Co., of Passaic, N. J., who state that it has had an enthusiastic acceptance in each plant in which it was introduced. It is applied on the quetsch or pad rolls. Although Anti Fume NS has considerable softening properties, it is stated that it is compatible and works well with most other finishes including non-slip agents.

• Philadelphia Textile Manufacturers Meeting

Charles W. Carvin, President of Charles W. Carvin Company, Inc., New York, will be the principal speaker at the Annual Meeting of the Philadelphia Textile Manufacturers Association on Thursday, November 18, in the Downtown Club, Philadelphia, it was announced recently by Rinaldo A. Lukens, President of the Association.

The Annual Meeting of the P.T.M.A. will begin at 5:30 P.M., at which time the membership will ballot for the selection of a new Board of Directors. A dinner is planned for 6:30 P.M. to be followed by a brief business session and Mr. Carvin's talk.

The Philadelphia Textile Manufacturers Association numbers among its membership approximately two hundred fifty of the leading textile concerns in the Philadelphia area.

The Philadelphia Textile Manufacturers Association was chartered in 1920 though many of its members were directly responsible for the founding of the Philadelphia Textile Institute in 1883.

Mr. Carvin, an alumnus of the Philadelphia Textile Institute 1923, and the National Chairman of the Philadelphia Textile Institute Development Fund, is a native Philadelphian now located in the New York textile market.

• Verney Appointment

Gilbert Verney, president of Verney Corporation, has announced the appointment of Richard W. Powell, above, to the newly created position of Production Manager of the Peterborough Division. His appointment will permit William F. Brosnan, Director of Dyeing and Finishing, to devote a greater portion of his time to activities outside the Peterborough finishing plant, Mr. Verney said.

Mr. Powell was formerly Superintendent of the Lincoln Bleachery and Dye Works, Providence, Rhode Island. He received his technical education at the College of Technology, Manchester, England, and spent several years completing his practical mill training in the dyeing, printing, and finishing branches of the industry in that country. He was for nine years with the Dominion Textile Company of Montreal, Canada, where he was successively chief chemist, superintendent of dyeing, and assistant plant superintendent. Prior to joining the Lincoln plant in Providence, he was director of research and development for the Bradford Dyeing Association.

• To Receive IRI Medal

Vannevar Bush, retiring president of the Research and Development Board of the national military establishment, has been chosen to receive the 1949 Industrial Research Institute medal awarded for outstanding contribution to the field of industrial research, it was announced at the fall meeting of the Institute in Chicago, October 11-13.

The Institute, composed of one hundred and six companies representing diversified types of industry throughout the nation, cited Dr. Bush for his inspired leadership in the Office of Scientific Research and Development, in marshaling industrial and academic research and coordinating it with the military effort in the common defense, thus developing an instrument of government so effective as to provide a pattern for continued service. The medal will be presented February 3 during the winter meeting of the Institute at Rye, N. Y.

• Monsanto Agreement on De Nora Cell

Monsanto Chemical Company has announced a tentative agreement with Dr. Oronzio De Nora, head of an Italian company engaged in the manufacture and sale of electrochemical plants, for the use and sale of his company's mercury cell in the U. S. The De Nora cell is for the manufacture of chlorine, caustic soda and hydrogen.

In addition to production of pure caustic in strengths up to 70 per cent without concentration, the De Nora cell is said to produce chlorine and hydrogen of high purity at costs competitive with the best diaphragm cells now in use. It is a culmination of European improvements in mercury cells.

Monsanto was represented in negotiations leading to the agreement by Carlton M. Dean, who recently returned from a year-long stay in Europe. He is a member of the company's engineering sales department, which will handle the sale of the new cell and also of complete chlorine plants.

"More and more industries," Dean said, "need pure caustic, which the mercury cell is ideally suited to produce. Increasing application will doubtlessly also be found for mercury amalgam. Many installations are being made in other countries, but a few were in operation prior to World War II."

Dr. Vittoria De Nora is arriving in the U. S., Mr. Dean said, to survey with Monsanto American requirements and possibilities of the new cell.

• Joins Textile Research Institute

Lance Turner has been appointed assistant to Dr. John H. Dillon, Director of Research at Textile Research Institute. Mr. Turner will assist in Institute membership promotion and will serve as liaison between the industry and the T.R.I. laboratories at Princeton. He will interpret research results to the industry, advise on commercial gains that may be expected from research, and bring laboratory problems to the Institute from its mill membership.

A graduate of Texas Technological College, Lubbock, Texas, with a Bachelor of Science Degree in 1941, Mr. Turner is thirty years of age. He has had manufacturing experience in several textile mills including West Point Mfg. Company, where he was engaged in production planning, quality control, and establishment of production standards.

During the war he was a Quartermaster Officer assigned to the Air Forces and served both in the United States and in the India-Burma Theater. He attained the rank of Lt. Colonel, a rank which he still holds in the Air Force Reserve.

Since August, 1947, Mr. Turner has served as Technical Aide to the National Research Council, Committee on Quartermaster Problems. In this position he has advised the Committee on matters of research conducted by the Quartermaster Corps, and assisted in the liaison between the Committee, the research contractors, and the Office of Quartermaster General.

• Production of Acetophenone

The first large-scale production of acetophenone has just been announced by Carbide and Carbon Chemicals Corporation. Acetophenone (phenyl methyl ketone) had been previously available only in small lots, but can now be furnished in tank car quantities at a new low price.

Acetophenone is said to be a good solvent for fats, resins, oils, dyestuffs, and gums. It is stated that it has a powerful but pleasant odor that makes it valuable as an odor-masking agent in perfume compounding.

It is believed that commercial availability of acetophenone will stimulate its application in many new fields. The combination of the benzene nucleus and the ketone group suggests many other possibilities for its use as a raw material in the manufacture of dyestuffs, rubber chemicals, pharmaceuticals, and insecticides.

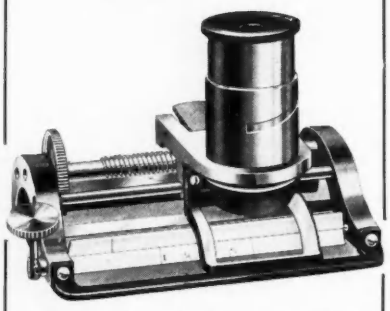
Phenyl methyl carbinol also will be put on the market by Carbide and Carbon Chemicals Corporation in the near future. Increased availability of phenyl methyl carbinol should stimulate its use both as a solvent and in syntheses.

• Two Models of B & L Microscopes

Two models of the new line of Bausch & Lomb wide-field stereoscopic microscopes are described in the October issue, No. 104, of "Laboratory Equipment Bulletin" the four page bimonthly publication of Will Corporation, Rochester 3, New York.

The bulletin gives the latest information on the Beckman Flame Spectrophotometer, recently improved by the adaptation of a heated spray chamber and concentric type atomizer. Among the other new items described are the "Precision" senior model "Mag-Mix" magnetic stirrer, and "Glas Col" heating mantles made of quartz. Bulletin No. 104 is available from the firm upon request.

• Lowinson's Thread Counter



Shown above is Lowinson's Thread Counting Micrometer which is said to combine accuracy, speed and ease in counting threads in woven fabrics. It is available from Charles Lowinson, 475 Fifth Avenue, New York City. It is made with five scales of measurement; three silver reflectors afford a lighted field which travels with the moving lens; the lens can be moved with accuracy by turning the governing screw; a needle is attached to one of the reflectors and points directly to the scale but does not cover it; the reflectors, needle and lens can be returned instantly to the starting point by pressing a lever; the governing screw affords stability to the instrument during operation. A circular is available upon request.

• New Celanese Chemical Office

The Celanese Corporation of America announces the opening of a new Chemical Division sales office in Boston, Massachusetts to supplement its organic chemical sales offices in key metropolitan areas over the country. John W. Stevens, who has been in the firm's sales division for the past year and a half, is in charge of the New England sales office, located at 140 Federal Street.

Present operations call for the shipment of bulk Celanese chemicals into the New England area principally via the company's recently established tanker terminal facilities at New Haven, Connecticut.

• Joins Rodney Hunt

Langdon M. Phillips, former engineer with the Shell Oil Company, has been appointed a sales engineer by the Rodney Hunt Machine Co., Orange, Mass. He will operate from the home office, covering Massachusetts, Rhode Island and eastern Connecticut.

• Courses at Georgia Tech

Through the cooperation of the A. French Textile School and Georgia textile mills, the Georgia Tech Engineering Evening School is again offering this fall textile courses for people in industry. The two subjects, textile raw materials and yarn manufacture, are taught on Tuesday and Thursday evenings by James I. Teat, a textile engineering graduate and former faculty member of Georgia Tech and now weaving overseer at Whittier Mills.

Herman A. Dickert, director of the A. French Textile Schol at Georgia Tech, in commenting on these textile evening courses stated, "One of the oldest industries in the world, actually, is one of the most modern because the textile industry believes in applying the results of scientific research and techniques and in training their people in the latest methods. Such cooperation between the industry and textile schools points to limitless possibilities in the future."

• Program on Wool Research

Secretary of Agriculture Charles F. Brannan recently announced the signing of a contract by which the Government will contribute $20,000 annually to a program of fundamental research in wool designed to improve the textures of fabrics made of every grade of wool.

Characterizing the action of his department as a service to the people, Secretary Brannan in a transcribed radio interview expressed the opinion that the program, sponsored jointly by the American Wool Council, the International Wool Secretariat and the Textile Research Institute of Princeton, N. J., would stimulate the production of wool in the United States, now at the lowest point in 25 years.

"What we are working for is efficiency in the use of the things that we are able to produce ourselves," Secretary Brannan said. "This program is working in that very direction."

• New Device for Measuring Moisture Content

An increase of 20-30 percent in production of textile drying machines equip-

Ralph V. Coles

ped with the Drimeter, an electronic instrument for continuously measuring exact moisture content, is claimed by the distributor, Fielden Electronics, Inc., a newly established affiliate of Fielden (Electronics) Ltd. of Manchester, England.

Besides increasing production, accurate moisture control results in better quality of cloth, greater efficiency of machinery and lower fuel consumption, the manufacturer says. The Drimeter is installed on any type of fabric dryer or warp sizing machine, and is designed for use with any fiber or mixture of fibers. Percentages of moisture content is indicated directly on a meter.

President of Fielden Electronics Inc. is John E. Fielden. Vice-president and active heard of the company in the United States is Ralph V. Coles. Offices are at 1171 New York Avenue, Huntington Station, New York.

• International Nickel Appointment

Dr. John G. Dean has been appointed Head of the Industrial Chemicals Section, Development and Research Division, of The International Nickel Company, Inc., it was announced by T. H. Wickenden, Vice President in charge of that Division. O. B. J. Fraser, Assistant Manager of the Company's Development and Research Division, had been directing the Section previously.

Dr. Dean has been associated with the activities of the Industrial Chemicals Section since 1942, serving first as Senior Fellow for International Nickel's multiple fellowship at Mellon Institute for Industrial Research in Pittsburgh, then as Advisory Fellow to that program with headquarters in New York.

He is a graduate of Brown University and also holds a M.S. degree from that institution where he specialized in metallo-organic chemistry. He continued his graduate studies at Columbia University with thesis work in the field of solutions of heavy metal electrolytes, leading to a Ph.D. degree. Dr. Dean then joined the Research Department of the Permutit Company and for several years served as Director, Laboratory Research Division for that organization. He has also done research in education at Sarah Lawrence College in connection with the development of special courses in the physical sciences. He has contributed articles to chemical literature and has also been associated with the development of several patents.

Dr. Dean is a member of the American Chemical Society and the American Association for the Advancement of Science.

• Expansion of Amalgamated Chemical

Two steps in the expansion program of Amalgamated Chemical Corp., Philadelphia—the naming of a technical sales representative for the New England territory and the beginning of construction work on a new laboratory for the research division—have been announced by Harold B. Dohner, President.

Charles E. Seel, a technical sales engineer with Dow Chemical Co. for the past five years and previously a salesman for American Home Products Co., Jersey City, N. J., is Amalgamated's New England representative. He will also cover Philadelphia and eastern Pennsylvania. Mr. Seel is a graduate of Wesleyan University. He is a member of the American Association of Textile Chemists and Colorists, and the Philadelphia Chemical Club.

The new laboratory facilities now under construction will be completed in about 60 days and will be available to the industry for consulting service. Hillary Robinette, Jr., is research director.

• Joins Hatch Textile Research

Hatch Textile Research, 25 East 26th Street, New York, N. Y., Testing Laboratory, has announced that John West Sheppard has joined its staff as Textile Technologist and Technical Assistant to Herbert H. Hatch, Director.

Mr. Sheppard was formerly in the employ of The Crown Tested Division of the American Viscose Corporation and the New York Laboratory of the General Dyestuff Corporation.

Adolph Marklin, who has been with this Laboratory nearly nineteen years, remains as Senior Technician.

• Annual Meeting, Processing Oils Association

The seventeenth Annual Meeting of the Processing Oils and Chemicals Association, Inc., was held at the Hotel Claridge, Atlantic City, N. J., on September 15th and 16th.

The first day of the meeting was devoted to a business session, and discussion of raw material, credit and other current conditions and future prospects in the industry was both interesting and informative. The annual dinner that evening and entertainment features the following day, as guests of Fred Scholler, were thoroughly enjoyed.

J. Everett Allen of Arkansas Co. was reelected President for the coming year, J. H. McChesney of Leatex Chemical Co., Vice-President, and H. B. Sweatt, 55 West 42nd St., New York City Secretary-Treasurer.

• Nopco Representative

John J. McCloskey, Jr. is representing the Industrial Division of Nopco Chemical Company, Harrison, New Jersey, in the Central Atlantic states, according to a recent company bulletin. Mr. McCloskey has been employed in the company laboratories working on product applications and customer service problems.

He is a graduate of the University of Virginia, class of '42, and holds a B.S. degree in Chemistry. His war record is a distinguished one. He is the Captain McCloskey referred to in a March, 1948, *Reader's Digest* article titled "Captain McCloskey's Mission."

Mr. McCloskey's sales territory will include Maryland, Virginia and eastern West Virginia. In addition to sales on the processing chemical line of Nopco he will handle the products of Metasap Chemical Company, a wholly owned subsidiary.

• Exhibit on American Textiles '48

More than one hundred and eighty-five contemporary American fabrics have been selected by The Metropolitan Museum of Art for the forthcoming industrial arts exhibition, American Textiles '48, opening on November 24 at the Museum.

Practically every known textile fiber, both natural and man-made, will be represented by sample pieces which measure three yards in length. The exhibition includes the work of one hundred and twenty American firms from Maine to California, who were asked by the Mu-

Architect's sketch of the Edgar and Emily Hesslein Library of the Philadelphia Textile Institute.

seum to submit five examples of fabrics currently on the market "to represent their best efforts and to be most fully in the spirit of the present day."

The exhibition will be on view from November 24, 1948, through January 9, 1949.

• Changes in the Chemistry Division

Dr. G. E. F. Lundell, internationally known chemist, has retired from active duty as Chief of the Chemistry Division of the National Bureau of Standards, and Dr. Edward Wichers, former Assistant Chief, has been appointed Division Chief. Dr. Lundell will remain on the Bureau staff as consultant to the Division. Dr. William Blum, head of the Electrode position Section, has been appointed Assistant Chief.

• Staley Salesman

W. Wilson Seay, Goldsboro, N. C., has been appointed a salesman in the special products division of A. E. Staley Manufacturing Co., Decatur, Ill., G. H. Walker, division manager, has announced. Mr. Seay formerly was associated with Tri-Pack Machinery of Harlingen, Texas.

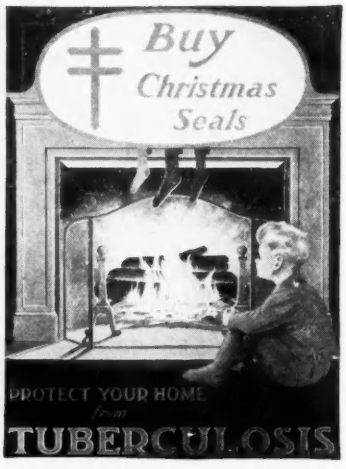
• New PTI Library

A gift to the Philadelphia Textile Institute Foundation by the Edgar and Emily Hesslein Fund, Inc., in the amount of $50,000 was recently anounced by Charles W. Carvin, Chairman of the PTI Development Fund.

The gift was presented by George W. Walker and H. Heinbockel, Treasurer and Secretary, respectively, of the Hesslein Fund to Mr. Carvin and Robert L. Huffines, Jr., of Burlington Mills Corp. (N. Y.), Chairman of the National Special Gifts Committee, at the offices of Hesslein & Company, at 75 Worth Street, New York, on Friday, October 22nd.

The entire $50,000 sum is given for the creation of a library for the Philadelphia Textile Institute to be erected on the new School site in Germantown, and will be known as The Edgar and Emily Hesslein Library. Work on the main School building, to accommodate 500 students, is progressing rapidly and is planned to be complete and the building ready for occupancy in September, 1949.

The erection of the Hesslein Library will be commenced at an early date and is expected to be complete for the opening of the Fall term of 1949 as well.



• Nopco Appointment

John J. Ryan has been made a member of the Eastern Area sales force for the Industrial Division of Nopco Chemical Company, according to a recent company bulletin. Prior to this appointment, Mr. Ryan spent several years in the company's laboratories at Harrison, New Jersey specializing on product applications and customer service problems.

Mr. Ryan is a graduate of New Bedford Textile Institute and North Carolina State College. During World War II, he served four years as an engineering officer with the United States Naval Reserve.

In Pennsylvania, Mr. Ryan succeeds Walter E. Brewer recently promoted to district sales manager. In addition to sales on the processing chemical line of Nopco he will handle the products of Metasap Chemical Company, a wholly owned subsidiary.

OBITUARY

JOSEPH S. UNTERWEISER

JOSEPH S. UNTERWEISER, salesman for E. I. du Pont de Nemours & Co., Inc., Organic Chemicals Department, Philadelphia, Pa., died suddenly on October 14th. Mr. Unterweiser started in the dyestuff business with Kalle & Co. shortly before the First World War. After serving in the United States Army during this war, he subsequently became associated with the Newport Chemical Co., first as a technician and later as salesman. After Newport's affiliation with the Du Pont Company, Mr. Unterweiser continued contacting the Philadelphia territory for the latter concern until the time of his death. He was a Charter Member of the Philadelphia Section, AATCC, and was well known in the trade, particularly among the dyers of woolen and synthetic fibers.

JOHN D. FLEMING

JOHN D. FLEMING, 58, a member of the Organic Sales Development of Monsanto Chemical Company, died of a heart attack at his home in St. Louis on October 12.

A native of St. Louis, Mr. Fleming was a graduate of Washington University, Class of 1913. He received his M.S. Degree there the following year. Mr. Fleming served for some time as chief chemical engineer for the St. Louis Water Department. He had been with Monsanto since 1934.

Mr. Fleming is survived by his wife, a daughter and two sons.

• PATENT DIGEST •

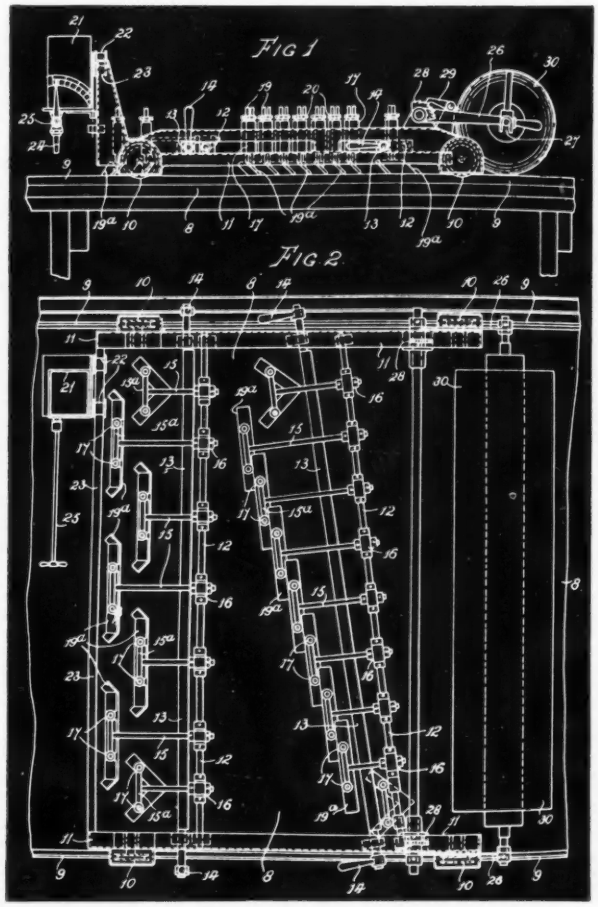
Screen Printing—Removing and Applying the Gum Solution for Fixing Fabrics D, 4

Brit. P. 596,525
(Macclesfield Engineering, Janes, January 6, 1948)

PAUL WENGRAF

The usual procedure for fixing fabrics to be screen-printed on tables consists of glueing them on the table's surface. The tables being very long (150-200 feet) it is evidently a time consuming work to remove the old gum layer completely from the surface and to apply the fresh gum layer in an absolutely even distribution so that no irregular print can result. This work is done mechanically according to the present invention. Figs. 1 and 2 show the construction of the carriage to be mounted on the table after the printing procedure. The principal part of this carriage is the device containing several independently mounted and self-levelling blades (19 a) resting on the surface of the table. Two cross-members (12), carrying the blades are provided; as illustrated in Fig. 2 they are positioned in an angle so that the two sets of blades, fixed on the cross members *overlap* in sliding across the table. Another cross-member (13) is arranged parallel to member (12). It can be turned by a handle (14), laying flat in one position and projecting upwardly when turned, so that the blades (19 a) can be lowered or raised at will. When a table has been used for printing, the carriage is mounted with the blades down. Water is shed over the tables and the blades, one set overlapping the other one, remove efficiently the old gum. Thereupon the roll of fresh cloth to be printed is placed in the slots of the arms (26). Fresh gum solution is applied from tank (21) by the delivery opening (24), controlled by valve (25). The adhesive is poured on the table and equally distributed by the movement of the blades and thereupon the fabric is mechanically drawn over the table and fixed by slight pressure. It is an important part of this construction that the blades move each independently and resiliently.

Reference: Devices for gumming mechanically the cloth and fixing it on the printing table are described in Leonard's Brit. P. 406,928 and in French Patent 819,163 (Boeuf).

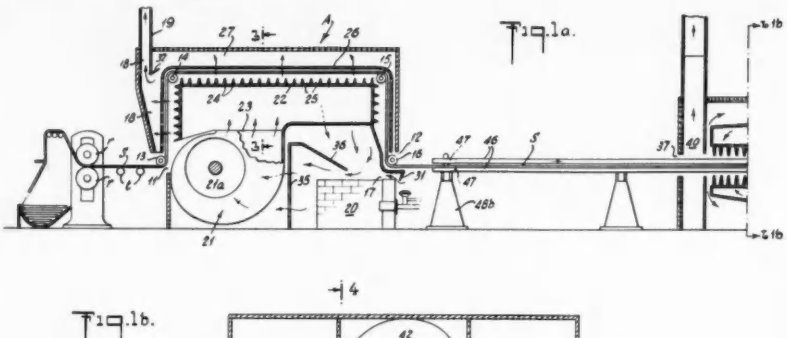


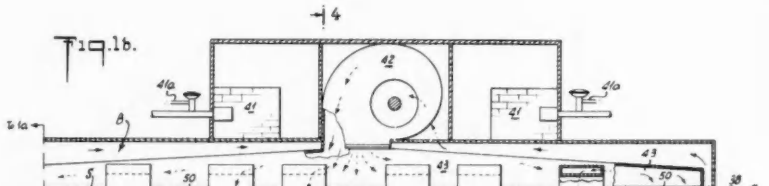
Screen Printing.
B. P. 596,525

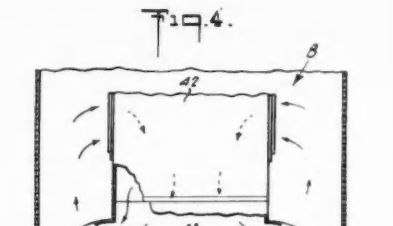
Drying Fabrics—Apparatus; Drying in Two Steps with Air G, 3

U. S. Pat. 2,440,648
(Uxbridge Worsted Co., Walter, Rose, April 27, 1948)

The principle of the drying appartus protected by the present invention is in the arrangement of two drying chambers: the first one has the purpose of pre-drying the cloth at a very high speed and at a relatively high temperature. This step *must not* be carried out until complete drying of the cloth is achieved because the high temperature might otherwise damage the fiber's structure. The other chamber continues and completes the drying process *at lower temperatures*, using a tenter frame for giving the cloth the dimensions desired. Fig. 1a illustrates the first part i.e. chamber A in which fabric (S) is introduced after having passed two vacuum tubes (t) or other devices (for instance squeezing rollers) to reduce the moisture content as far as possible. The cloth passes the chamber A preferably in a twice broken line, describing the sides of a rectangle (rollers 13, 14, 15, 16). A stream of hot air or gas is brought into contact with the fabrics by being forced through channels (25). The hot air is generated by a heater (20), connected with a fan (21). The fan pushes the hot air through the casing (22), the channels (25) and the perforated plates (26) into the open space (27) of the casing wherefrom the moist air is discharged through the exhaust conduit (19). Although the temperature of the drying air or gas is kept very high (in the order of 700-800° F. and even higher) no damage for the cloth has to be ap-







Drying Fabrics
U. S. P. 2,440,648

prehended because of the constant evaporation of moisture and the high speed of the material transported through chamber A. The passage of the cloth through chamber B, containing the tenterframe and a fan (42), leading warm air around the cloth, can be seen in Fig. 1b. The special construction of the part of chamber B containing the fan (42) is illustrated in Fig. 4.

References cited by the Patent Office, among others:

U. S. Pat. 2,378,703 (Sturtevant Co.): protects a web drying machine characterized by blowing air against the upper side of the cloth and by sucking the moist air from the under side.

U. S. Pat. 2,346,437 (Brown Instrument Co.): describes a moisture control system used in slashing devices.

U. S. Pat. 2,331,042 (Parkes): a web drying apparatus provided with blowers on both sides of the web and characterized by the fact that the nozzles mounted on one side of the web are fixed while they are adjustable on the other side.

Other references are:

Ger. P. 641,090 (Bergmann): describes a drying apparatus for fabrics. The device consists of two partitions, the first one containing hot air fans which gradually warm up the material while the second chamber is kept at a lower constant temperature.

U. S. Pat. 2,109,704 (James Hunter Machine Co.): protects likewise a drying device (tenter frame) divided in different chambers. The temperature of the first one is the highest and the subsequent chambers are warmed at gradually decreasing temperatures.

Nylon Fabrics—Elastifying Treatment G, 2, 04

U. S. Pat. 2, 441,085
(Du Pont, Schneider, May 4, 1948)

A method has been developed for imparting to nylon fibers a durable high elasticity. It is well known from the first nylon patents (U. S. Pat. 2,071,250; 2,071,253; 2,130,948; DuPont, Carothers) that the nylon yarns, coming from the spinnerettes, can be cold drawn up to 300 percent their original length. This property is characteristic for the yarns which are later on to be knitted, woven and so on. In contrast hereto the yarns to be treated according to the present method are not or *almost not drawn* in the solid state under tension and hence less oriented than the normal cold drawn nylon fibers. Filaments are used in the present invention which have not been more drawn than 2:1 (or 200 percent). Still a better result is obtained when the yarns are not drawn at all. It has been observed that under this condition the yarns react readily with lower alcohols, formaldehyde and an acid catalyst at temperatures between 60-90° C. It is advantageous to bring the filaments first into the desired form (for instance by twisting, weaving, knitting or the like) and to subject them thereupon to the elastifying treatment, mentioned above, which treatment can be interrupted when a maximum swelling effect could be observed. This phase is at the same time the point of optimum reaction. The swollen fabric is first placed in alcohol and the reagents are thereupon leached out in water. A *direct quench* in water might cause an uneven reaction and the precipitation of a small amount of dissolved methoxy-methyl-polyamide. According to an example a fabric composed of a filling of undrawn nylon yarns and a warp of normal (cold drawn) nylon yarns was placed in a solution of 5 p. methanol, 5 p. paraformaldehyde and 1 p. oxalic acid and maintained in this solution for about 20 minutes at 75° C., washed thereupon first in methanol (10 minutes), in methanol/water (1:1) and finally for 24 hours in pure water. The fabric could be stretched up to 100 percent in the direction of the non-drawn yarn, giving fabrics of high resilience.

References cited by the Patent Office, among others:

U. S. Pat. 2,177,637 (Du Pont): for improving the resilience of polyamide filaments the articles are treated perferably in a dilute NH_4Cl solution with formaldehyde or in a bath containing formaldehyde-liberating agents.

U. S. Pat. 2,275,008 (Du Pont): a *water soluble* synthetic linear polyamide is described, containing an insolubilizing agent (dimethylolurea-dimethylether or the like).

Shrinkproofing Textiles—Treatment with Neutral Aldehydes, Followed by Acid Steaming A, 2, 04

U. S. Pat. 2,441,859
(Alrose Chemical Co., Weisberg, Stevenson, Beer, May 18, 1948)

Former suggestions for shrinkproofing textiles, as far as chemical methods are concerned, comprised principally treatments with precondensates of the urea-formaldehyde type or of corresponding melamine-aldehyde compounds. These

processes are said to impair the wearing qualities of the fabrics. Cotton loses between 20-50% of its original tensile strength; rayon as well as cotton suffers a considerable decrease of resistance to abrasion. In addition, aftertreatments with chlorine containing solutions (for instance in subsequent bleaching or cleaning operations) have notoriously a tendering effect on resin prepared textiles. Another group of patents recommended a treatment with a 10-12% acidified formaldehyde solution, followed by a baking process. The results were not satisfactory: the fabrics acquired a "raggy" hand and a great loss in abrasion resistance was observed too. According to the present invention, fabrics (wool as well as vegetable fibers) are impregnated with neutral aldehyde solutions (neutralized formaldehyde, glyoxal), squeezed and thereupon subjected to an acid aging (steaming) process, analogous to that which is carried out in fixing Rapidogen colors. Instead of these neutralized aldehyde solutions, compounds can be applied which split off aldehyde in the acid steam atmosphere preferably *hexamethylenetetramine*. An example teaches treating a 100% cotton cloth with a 3% hexamethylene tetramine solution, squeezing the sample until it retains 100% of its original weight, drying it at 120° F. and liberating the aldehyde in acid steam of 212-220° F. within about 5 minutes. The results were superior to those obtained in a parallel treatment with a 10% technical 36% formaldehyde solution.

References cited by the Patent Office, among others:

U. S. Pat. 2,311,080 (Du Pont): immersion of goods in formaldehyde plus ammonium salts followed by a treatment in an inert solvent (for instance xylene) at 130° C. The process is mainly intended for creaseproofing textiles.

Brit. P. 548,079 (Heberlein): wool-like rayon is obtained by impregnating the yarns (which have first been twisted in one direction and then in the opposite sense) with formaldehyde in the presence of an acid catalyst.

Other references: Austrian Patent 143,302 (I. G. Farben) recommended the use of glyoxal in creaseproofing operations. The fabric was impregnated with a neutralized, aldehyde developing compound (glyoxal-sodium bisulfite), decomposed at about 100° C., probably in a steaming process. The use of neutral aldehydes for the same purpose was suggested in Brit. P. 450,620 (Celanese): aldehydes are mixed with wetting or penetrating agents (Igepons or the like). Compare also references to U. S. Pat. 2,436,076 (REPORTER, 475, 1948) and Brit. P. 586,598 (REPORTER 103, 1948) discussing the use of glyoxal in shrinkproofing finishes.

Water Repellent Fabrics—Wax, Paraffin or the Like; Emulsions Applied from Cation-active Dispersions G, 2, 02

U. S. Pat. 2,442,972
(Edelstein, June 8, 1948)

A well known textile treatment for rendering textiles water repellent consists of applying a non-substantive emulsion of oils, waxes, etc. to textiles. These ingredients are fixed on the fibers by mere absorption of the dispersion and then evaporating the aqueous phase. In contradistinction to these known methods the inventor recommends in the present patent using more stable dispersions in which the dispersed particles are substantive to a great part of the commercial textile, particularly vegetable, fabrics. The dispersion is composed of a cation active substance of the Sapamine type and the water repellent (wax, etc.) particles. Since these particles are generally electropositive by themselves and not substantive to the fiber it is necessary to bring them in close association with the *cation active component* by a so-termed *"coupling agent"*. This compound is described as an organic substance, practically *non-ionized* in aqueous solutions and forming no salts with acids nor alkalies. A typical coupling agent is the stearic acid amide of hydroxyethyl amine: $C_{17}H_{35}CONH\text{-}C_2H_4OH$. Thus for instance a dispersion according to the present invention consists of:

2-15 cation active material (for instance Sapamine) 2.20 p. coupling agent.
up to 45 p. wax, also oil, pigments, etc.
balance water.

It must be understood that dispersions of this type can be used as water repellent solutions as well as for oiling leather (oil substituting wax or paraffin), for delustering rayon (dispersing a pigment) etc.

References cited by the Patent Office, among others:

U. S. Pat. 2,302,697 (Emulsol-Katzman): a surface active agent is obtained by mixing a quaternary ammonium compound with a higher amide.

U. S. Pat. 2,206,090 (Warwick Chem.): a waterproofing emulsion is described, containing generally, paraffin wax, aluminum acetate or formate and a cation active substance of the Sapamine type.

Other references are:

Finishing agents bearing electro-active charges, different from those of the substratum (mostly cellulose) were formerly described as "substantive" delustering, water repellent finishes and so on. H. Th. Böhme (Böhme Fettchemie) suggested in Brit. P. 425,431 using a high substituted quaternary ammonium compound and to add an anion-active auxiliary to this solution in order to regulate the speed of absorption. A permanent finish resulted. The same company suggested in Brit. P. 424,672 a method for "substantive delustering" by pasting up a pigment with an anion active agent and stirring this mixture in a cation active compound solution, thus imparting an electropositive charge to the mixture which was readily absorbed by vegetable fibers. The present invention differs from older, known processes therein that the pigments, oils or other insoluble particles are brought into closer association with the cation active agent by means of an electroneutral (non-ionic) agent.

Metachrome Dyeing Process—Using Cation Active Agents, Combined with Non-ionic Compounds C, 4, 06

U. S. Pat. 2,443,166
(Am. Cyanamid, Millson, Royer, June 8, 1948)

The four methods for dyeing metallizable azo dyes (chrome-complex, contained in the dyestuff molecule: top-chrome, bottom chrome, metachrome process) are discussed. The metachrome process according to which the metallizable dye is introduced into the dyebath at the same time as the chrome solution is preferred, presenting many advantages. Some of the dyestuffs of this group however do not give good penetration when applied according to this method. A very good penetration is achieved, as stated in the present patent, by adding a surface active agent of the cation active type and at least one *non-ionic surface active agent*, for instance a condensate of polyglycols or polyethylene oxide with a higher acid, a higher alcohol or the like. It is emphasized that cation active agents have some penetrating properties by themselves but they are apt to form a water insoluble complex with the dye which appears as a dark scum on the surfaces. This formation of scum is prevented by the non-ionic agent mentioned above which *on the other hand* has no penetrating quality whatsoever. Although a great number of cation active agents are available in the trade the specification proposes using particularly a *high substituted guanidine salt* (for instance ethanol-dodecyl-guanidine acetate). The non-ionic agent can be a polyethylene oxide condensate with a higher acid or a higher alcohol. According to an example a dyebath is prepared by dissolving the dyestuff, Colour Index No. 652 (Eriochrome Red B, Geigy, or Omega Chrome Red B, Sandoz), ammonium sulfate and potassium chromate in water, adding ethanol dodecyl

(Concluded on Page 772)

ABSTRACTS

The Effect of Dry Cleaning on Cellulose Acetate Rayon

Ciba Review, page 2549, No. 69, July, 1948.

There are certain dyes used on acetate rayon which are subject to bleeding and a change of shade when the garments are cleaned with trichlorethylene. It was found that these conditions occurred as a result of high temperature and no change or bleeding takes place if the garments are treated cold for from 10-30 minutes. It is also indicated that the solvents should be in as pure a state as possible.

Economy in Scouring Reducing Costs, Making Best Use of Scarce Materials

The Dyer and Textile Printer, page 245, Vol. C, No. 5, August 27, 1948.

A chemical test for soap can be useful in determining the value of a soap. However, a mill trial should always be made to indicate actual lathering and washing out properties. In addition to the selection of the proper soap, consideration should be given to the hardness of the water used, particularly if the supply is from a stream or well.

Piece scouring is discussed under two sections, that of dyed goods and undyed goods, with the main difference being the bleeding that may occur with dyed goods.

Several methods whereby soap economies can be effected are suggested and typical scouring formulations and procedures are included.

Rubber in the Textile Industry Latex Processes and Potentialities

W. H. Stevens, Textile Mercury and Argus, page 195, Vol. CXIX, No. 3097, August 13, 1948.

New developments in the application of latex to textile fibers are discussed. These processes may be grouped under the headings: (1) impregnated products, (2) coated products, (3) bonded products, and (4) adhered products.

The use of "Positex", a latex having positively charged rubber particles, is briefly reviewed and an example given of its particular advantages in coating fibers. The padding process of applying ordinary latex as a coating or impregnation is described. A typical latex formulation of the thickened type, to be applied by calendering or spreading, is given.

The use of antioxidants to obtain resistance to ageing is discussed and the application of combined latex and fiber products is reviewed in detail with such materials as rubberized tire cords and fabrics, rubberized hair, and latex treated shoe trade products included.

Earliest Ways of Coloring

A. Bühler, Ciba Review, Page 2478, No. 68, June, 1948.

The earliest and most primitive ways of applying color are described.

Primitive man used pigment colors rather than vegetable or animal colors and applied them merely by rubbing the pigment on to the material. These colors consisted mainly of red, white and black with blue and green more rare. Since the pigments were not applied in their natural form but rather as crushed powders they may be considered the first forms of dyestuffs. Plant juices were probably early used for coloring but in very few cases were either the mineral pigments or plant juices fast to washing. The poor light fastness of early coloring materials led to the preparation of contrasting effects by exposing portions of colored objects to sunlight to cause fading. Smoking and singeing processes were also primary means of obtaining colored objects.

Primitive Dyeing Methods

A. Bühler, Ciba Review, page 2485, No. 68, June, 1948.

Many of the substances used by primitive man in the dyebaths are not actually dyeing substances but rather auxiliaries. Although the values of these substances are little known as yet it has been proven that several have a beneficial effect whereas others are used purely on a superstitious basis and do not influence the dyeing process.

The privitive peoples in the tropical countries were familiar with both piece and yarn dyeing with the more advanced people gradually eliminating piece dyeing in preference to the less complicated yarn dyeing. Early dyebath preparations and dyeings were cold operations and although later use of warm baths was a step forward it did not provide a concentrated dye and therefore repeated dyeings were required to obtain a dark shade.

The early methods of applying substantive, vat and mordant type dyes are described.

Some Problems of Primitive Dyeing

A. Bühler, Ciba Review, Page 2501, No. 68, June, 1948.

The problems of primitive dyeing are discussed with relation to the development of better methods and materials. It is concluded that the primitive peoples were familiar with the simpler forms of direct, vat and mordant dyeing. However, it is indicated that some of the more evolved forms of vat and mordant dyeing found among primitive people are derived from highly civilized peoples.

The effects of cultural conditions and technical achievements on the development of dyeing are reviewed.

Catalysis in Textile Manufacture Sources of Fiber Structure Change

"Finisher", Textile Mercury and Argus, page 198, Vol. CXIX, No. 3097, August 13, 1948.

Catalysis and catalytic action in the manufacture of cellulose acetate as well as catalytic enzymes are discussed. The effects of catalysts in de-sizing operations and the optimum conditions of use of diastatic mediums are reviewed. Consideration is given to the severe tenderizing which may occur as a result of the catalytic action of iron and copper in peroxide or hypochlorite bleaching baths.

Publications Abstracted in this Issue

Ciba Review, Society of Chemical Industry, Basle, Switzerland.

The Dyer and Textile Printer, Heywood & Co., Ltd., Drury House, Russell Street, Drury Lane, London, W. C. 2, England.

Textile Mercury and Argus, 40 Spring Gardens, Manchester, England.

ADVANCES IN DYEING AND TEXTILE PRINTING PROCESSES IN ENGLAND

H. A. TURNER
Department of Textile Chemistry,
Manchester (England) College of Technology

AS IS WELL KNOWN, synthetic dyes took their origin from the discoveries made by the 19th Century British chemist Perkin, but were more fully exploited in Germany. In the inter-war period, Britain's dyestuff industry was engaged in building itself up against the competition of the powerful I. G. Farben, which was heavily subsidized by successive German governments, who recognized its importance as a political and economic weapon. The provisions of the Dyestuffs Licensing Act, which, broadly speaking, forbids the importation of any dye which can be made in Britain, led the dyemaking firms to concentrate largely on the economic production of the staple dyes used in large amounts, while foreign firms were obliged to introduce highly specialized, and often very expensively produced dyes to maintain a foot in the United Kingdom. Britain's dyemakers had two important triumphs. One was in solving the very great technical difficulties which existed in the dyeing of the newly introduced cellulose acetate rayon (Celanese). The other was the discovery of the Caledon Jade Green series which made available for the first time high quality, bright green vat dyes of good fastness in use, satisfying the dyer and printer by the ease with which they could be employed in the various tinctorial processes.

During World War II, the soundness of the organization was proved by the fashion in which the highly specialized and unbalanced requirements of the Fighting Forces were met. To give one instance, dye which would have colored many thousands yards of cloth was required for colored signal smokes, or as markers for airmen who had come down in the sea. Since then, with much of the great dyemaking industry of Europe severely disorganized, there has been great activity in increasing both the volume and variety of all classes of dye, so that almost all internal requirements are being met, and a growing export trade is being provided for.

An important development has been announced by Imperial Chemical Industries Ltd. Among the range of colors available for making dyed and printed goods of first-class fastness, there has been a gap caused by the absence of a very bright greenish-blue shade. This firm had a color of the requisite shade, of very unusual and complex chemical structure, the so-called phthalocyanin color, Monastral Blue. Unfortunately there was no satisfactory method for making it dissolve in water, so that it could not be applied by the usual dyeing methods, and it could only be used as a pigment, for inks, paints, paper, leather-cloth and the like. Now the problem of obtaining it in a form suitable for dyeing has been solved so satisfactorily that it can be made to give true dyeings by many of the orthodox methods of application, and, more important, it can be used in printing, alongside, or in admixture with other classes of dyes. Some of the patterns issued by the manufacturers of Alcian Blue 8G, as it is now called, illustrate that outstandingly beautiful effects can be obtained by its use. It will be understood that with the very large number of synthetic organic dyes that have been produced, it is increasingly difficult to discover one with really distinctive color and application properties.

A task which is now being carried out, and which will confer benefits on color makers and color users all over the world, is the compilation of a new *Colour Index*. A list is being made of every dye about which information can be traced, with a great many particulars about the chemical constitution, properties and methods of use, etc. It will be much larger in size, much more up-to-date, and will contain a far greater range of information than any previous index. This project is a joint undertaking of the British Society of Dyers and Colourists and AATCC.

One branch of textile research in which British scientists and technologists have always been very active is the study of the dyeing processes. There has always been a good deal of mystery attached to processes in which dye, dissolved in water, was taken up by textile fibers, and held more or less tenaciously in spite of washing or other treatments which might be expected to remove it. There has been a great deal of careful and accurate work on the subject of recent years, shared between the Universities of Manchester and Leeds, the dyestuff research laboratories of Imperial Chemical Industries, the research laboratories of Courtaulds, and the Shirley Institute. From this a generalized picture is being constructed. Put in simple language, it shows the separate dye molecules in a dyebath penetrating the finely porous structures which exist in all normal textile fibers, rather as shoals of small fish might enter a mass of coral.

The electrical forces which may help or hinder the entrance and retention of the dye molecules are being defined and measured, so that we are beginning to see why some dyes will dye some fibers and not others, why some dyes dye quickly and others dye slowly, why the dyeing of some fibers is aided by the addition of salt to the dyebath, while others need acid, and so on. The subject is a very difficult one and calls for the greatest possible experimental skill and a high degree of imagination in interpreting the results.

The postwar years have seen a great increase in the use of the silk-screen method of textile printing. This has given the textile designer a new freedom which is being used actively and boldly. Not only does the screen method avoid many of the limitations which are imposed by the nature of the process when colored patterns are made by weaving or by machine printing with engraved copper rollers; the preparation of the necessary screens of stencils is rapid, cheap and comparatively simple, even when a large number of colors or very large repeats appear in the pattern. Although the production by the machine is more rapid with the other processes, the preliminary operations of setting up a loom or the engraving of a set of printing rollers may be slow, elaborate and costly. The screen method is therefore well adapted for producing moderate quantities in a great variety of styles.

Interesting is the development in Britain of a new printing process by a Russian-born inventor. In this process, the printing colors are made into very stiff paste, resembling in consistency the cakes of water-color in a paint box. From these a patterned roller is built up, assembling the different colors in a kind of mosaic, or like an inlaid linoleum.

The cloth to be printed is passed, while damp, in contact with this roller which progressively transfers its pattern, and is slowly consumed in the process. The success of this method, which is comparatively cheap to operate, and which avoids the difficulties, inherent in all other methods of textile printing, of keeping the different colors of the pattern in their correct relative positions, derives less from the manner in which numerous technical difficulties have been overcome, than from the imaginative way in which the distinctive characteristics of the impression produced have been exploited to yield most arresting and beautiful effects.

Annual Processing Review Number appears December 13, 1948

Patent Digest

(Concluded from Page 769)

guanidine sulfate and one of the non-ionic agents as explained here above. The material is introduced into the neutral bath and boiled there for 30 minutes. Later on some acetic acid is added and boiling is continued. Samples, dyed without using the non-ionic component, will show traces of scum formed in the dyeing operation while the non-ionic assistant (giving a poor color strength when used by itself) helps to make the dyeing even and deep.

References cited by the Patent Office, among others:

U. S. Pat. 2,228,369 (Gen. Aniline): proposes to dye acid dyestuffs by adding quaternary ammonium, also sulfonium or phosphonium compounds in order to preserve the material from damage.

U. S. Pat. 2,121,337 (Gen. Aniline): amidines, especially oleyl or stearyl-biguanide are added to metachrome dyebaths.

Other references:

U. S. Pat. 2,040,796 (I. G.): suggests dyeing azo dyestuffs with chromium complex by adding non-ionic agents of the Peregal type, whereby the acid concentration can be reduced. Wool and other fibers of animal origin acquire generally a higher affinity for acid dyestuffs by a treatment with alkylenoxides or condensates thereof (U. S. Pat. 2,131,145/6, I.G.).

A combination of non ionic and cationactive agents however has not yet been proposed in metachrome dyeing processes up to now.

Compare also the reference to U. S. Pat. 2,434,178 (Am. Cyanamid) in REPORTER 306, 1948.

Cellulose Zincate Solution—Application Modified G, 2, 01

U. S. Pat. 2,442,973
(Edelstein, June 8, 1948)

The main patent, granted to the inventor for a textile treatment with alkaline zincate soltuions, was published on June 22, 1943 (U. S. Pat. 2,322,427). The present invention is a continuation in part of this process, comprising impregnating a fabric with an alkali zincate solution and precipitating the cellulose on the fabric under such conditions that *most but not all* of the *zinc is removed*. Another detail, mentioned in the specification, is the precipitation of cellulose by a mercerizing process, thus under strongly alkaline conditions. The examples show that not only a permanent finish but also an *anti-mildew* effect can be attained.

For references see among others: REPORTER 546, 1947 (U. S. Pat. 2,419,341, of the same inventor) and REPORTER 475, 1948 (U. S. Pat. 2,434,621, United Merchants).

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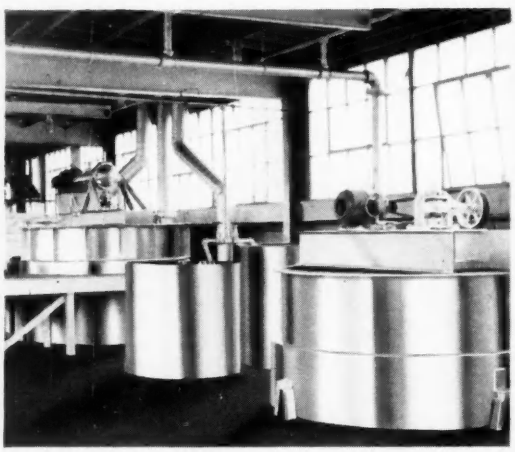

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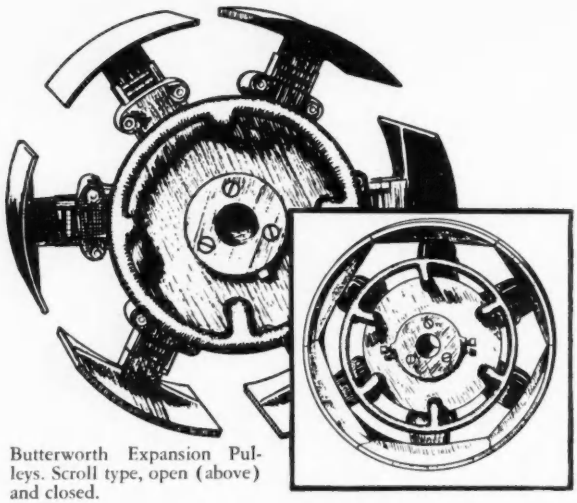

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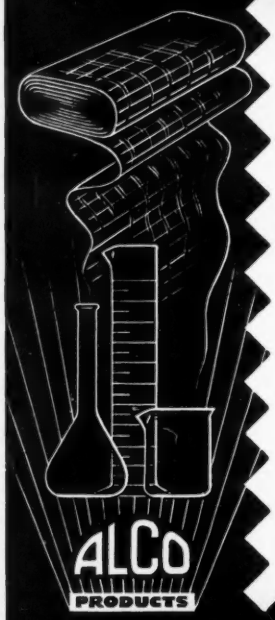

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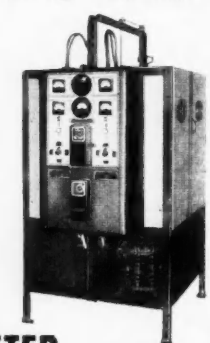

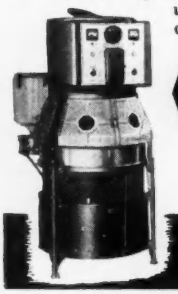

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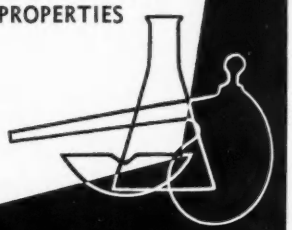

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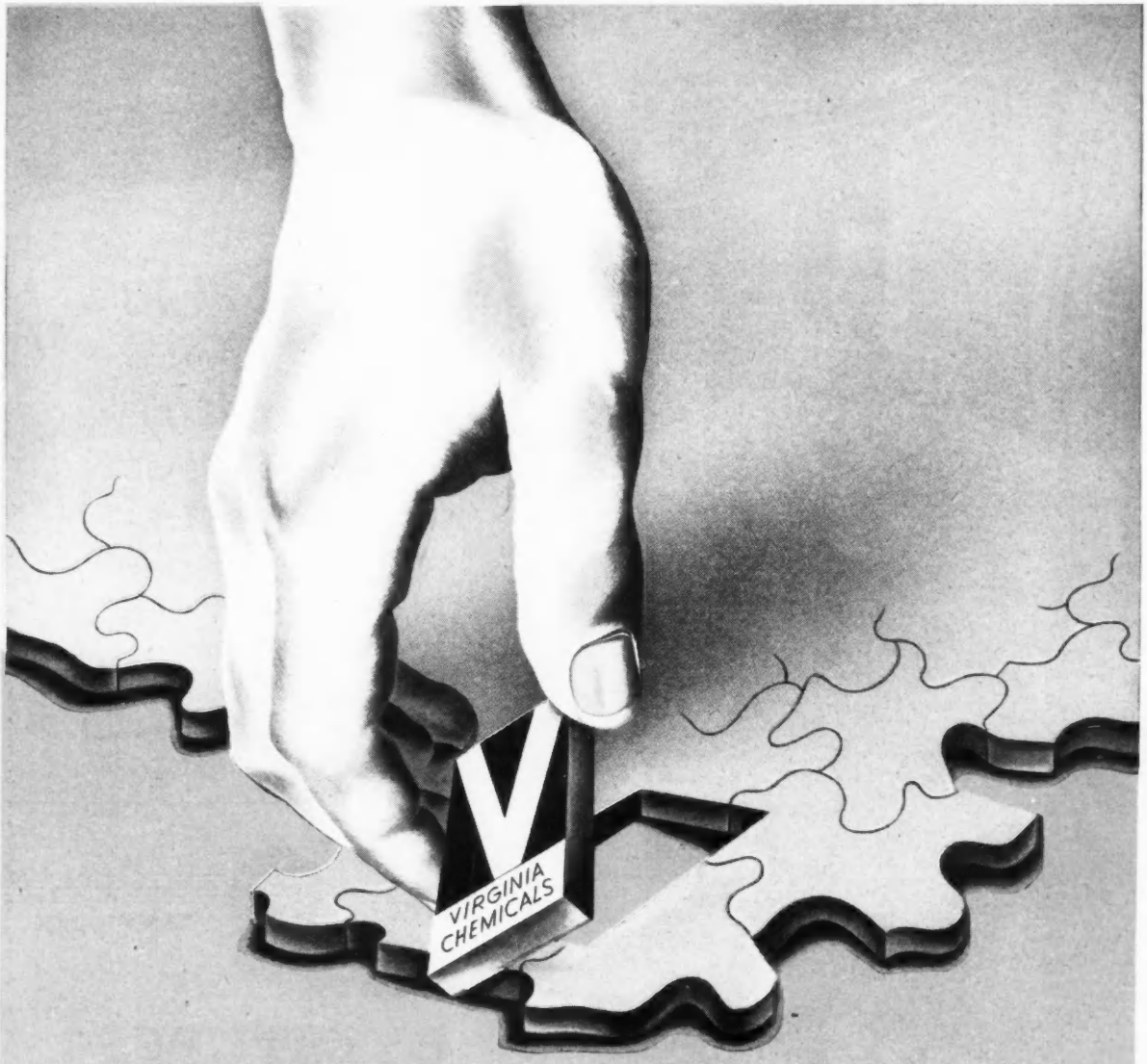

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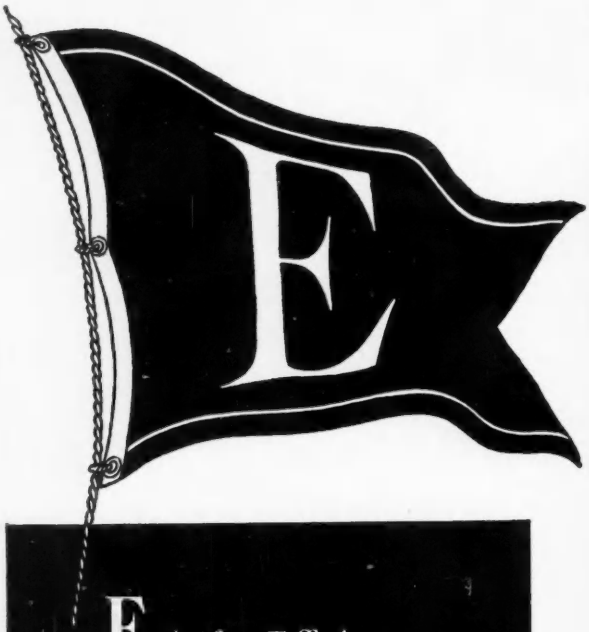

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POSITION WANTED: Experienced hosiery dyer, familiar with dyeing and bleaching of hosiery made from any kind of fiber. Capable of taking full charge of the Dye House. Write Box No. 531.

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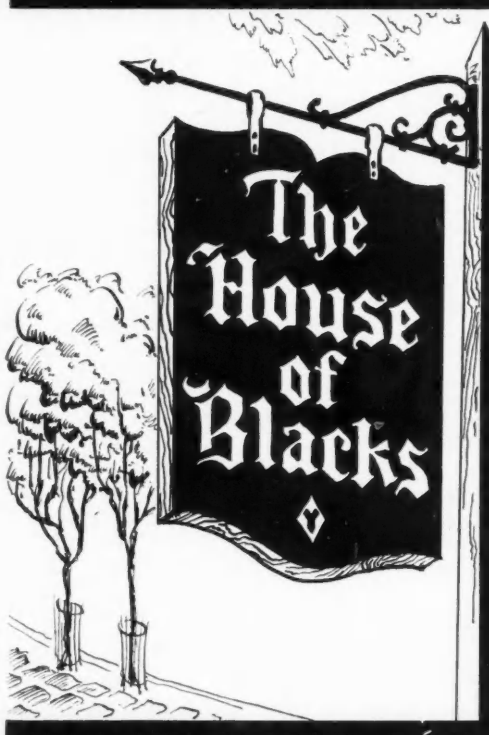

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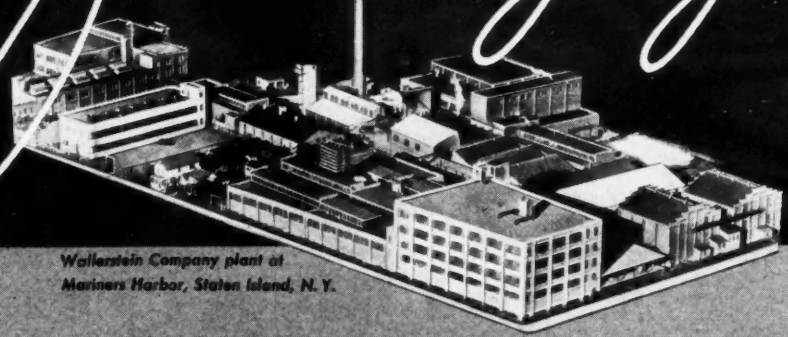

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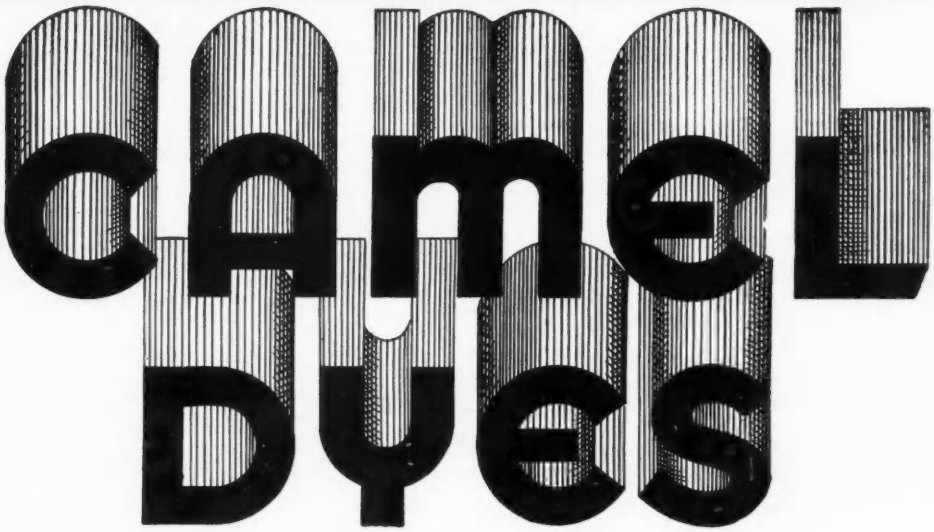

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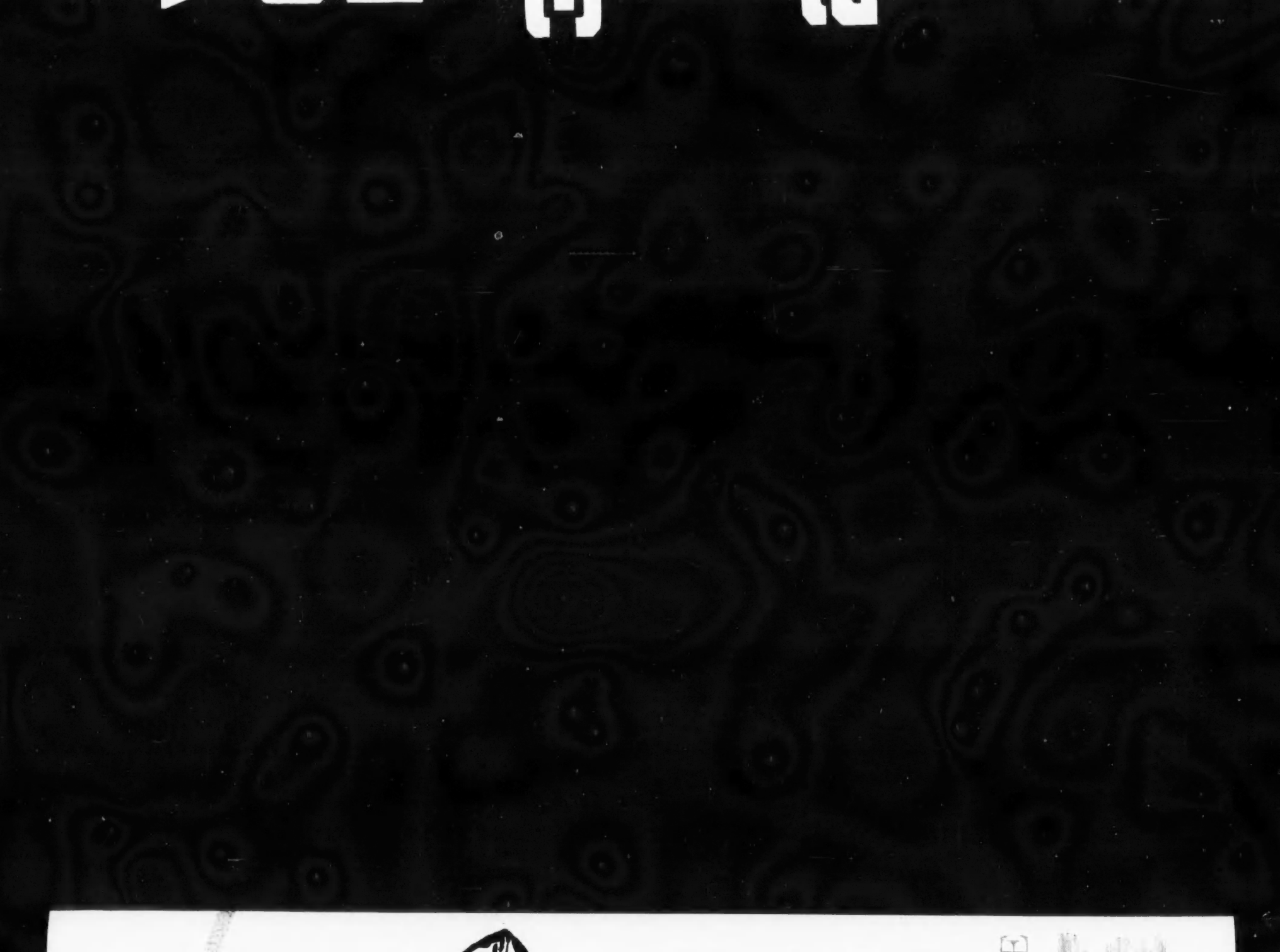
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